# SHARP SERVICE MANUAL

CODE : 00ZXEA201USME

## ELECTRONIC CASH REGISTER

## MODEL XE-A201

**SRV KEY : Not necessary**
**PRINTER : M-T51**
**(U and A version)**

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PARTS GUIDE

Parts marked with "⚠" are important for maintaining the safety of the set. Be sure to replace these parts with specified ones for maintaining the safety and performance of the set.

**SHARP CORPORATION**

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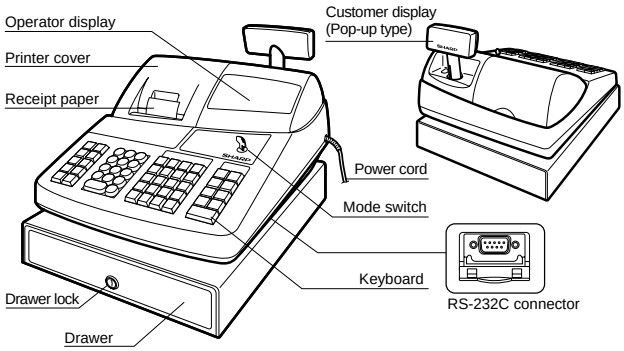
# CHAPTER 1. SPECIFICATIONS

## 1. APPEARANCE

■**Front view** ■**Rear view**




## 2. RATING

| | XE-A201 |
|---|---|
| Weight | 16.8lb (7.6kg) |
| Dimensions | 330 (W) x 428 (D) x 280 (H) mm<br>13.0 (W) x 16.9 (D) x 11.0 (H) inches |
| Power source | AC 120V (±10%), 60Hz |
| Power consumption | Stand-by 7W, Operating 34.5W (max.) |
| Working temperature | 0°C~40°C (32°F to 104°F) |

## 3. KEYBOARD

### 1) KEYBOARD LAYOUT

| Type | Normal keyboard |
|---|---|
| Key position | STD/MAX 53 |
| Key pitch | 19 (W) x 19 (H) mm |
| Key layout | Fixed type |

**Operator display** **Customer display (Pop-up type)**

**Amount:** Appears in the far-right eight (max.) positions. When the amount is negative, the minus symbol "-" appears before the amount.

**Number of repeats for repetitive registrations:**
The number of repeats is displayed, starting at "2" and incremental with each repeat. When you have registered ten times, the display will show "0." (2 → 3 ····· 9 → 0 → 1 → 2 ··· )

**Receipt function status:**
The indicator "_" appears in the RCPT OFF position when the receipt function is in the OFF status.

**Time:** Appears in the far-right six positions (hour-minute - "A" or hour-minute - "P") in the OP X/Z, REG, or MGR mode. "A" is displayed in the morning (AM), and "P" in the afternoon (PM). In the REG or MGR mode, press the [#/TM/SBTL] key to display the time.

■**Machine state symbols**

**P** : Appears during programming.

**E** : Appears when an error is detected.

**o** : Appears when the subtotal is displayed or when the amount tendered is smaller than the sales amount.

**c** : Appears when the [CONV] key is pressed to calculate a subtotal in foreign currency.

**F** : Appears when a transaction is finalized by pressing the [CA/AT/NS], [CHK] or [CH] key.

**C** : Appears when the change due amount is displayed.

**E-E** : May appear in the far-left three positions at the timing of key entry when the electronic journal (EJ) memory is full. (Depending on programming.)

**L** : Appears when the voltage of the installed batteries is under the required level. You must replace with new ones within two days.

**L** : Appears when the batteries are not installed, or the installed batteries are dead. You must replace with new ones immediately.

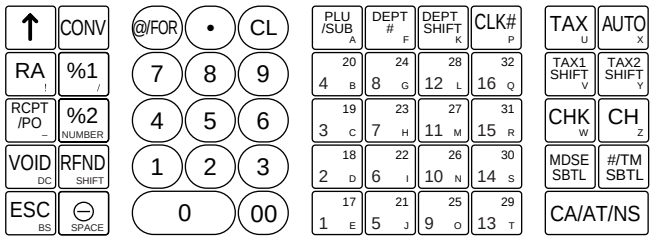
• : May appear right below the eighth and ninth places at the timing of finalization of a transaction when the electronic journal (EJ) memory is nearly full.
Also appears right below the tenth place when power save mode is effective.

**H** : Appears when the print head release lever is in the lifted position.

**PPPPPPPPPP** : Appears when the paper is out.

### 2) KEY LIST

■**Keyboard layout**




Note: The small characters on the bottom or lower right in each key indicates functions or characters which can be used for character entries for text programming.

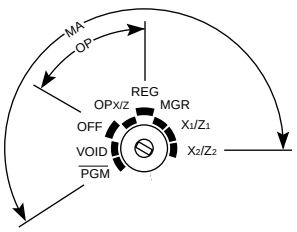
**■Key names**

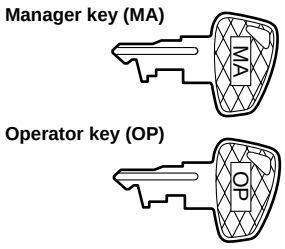
| KEY TOP | DESCRIPTION |
|---|---|
| ↑ | Paper feed key |
| RA | Received-on account key |
| RCPT/PO | Receipt print/Paid-out key |
| VOID | Void key |
| ESC | Escape key |
| CONV | Conversion key |
| %1, %2 | Percent 1and 2 key |
| RFND | Refund key |
| ⊖ | Discount key |
| @/FOR | Multiplication key |
| • | Decimal point key |
| CL | Clear key |
| 0-9,00 | Numeric Keys |
| PLU/SUB | PLU/Subdepartment key |
| DEPT# | Department code entry key |
| DEPT SHIFT | Department shift key |
| CLK# | Clerk code entry key |
| Dept1-32 | Department keys |
| TAX | Tax key |
| Tax 1 SHIFT | Tax 1 shift key |
| Tax 2 SHIFT | Tax 2 shift key |
| AUTO | Automatic sequence key |
| CHK | Check key |
| CH | Charge key |
| MDSE SBTL | Merchandise subtotal key |
| #/TM/SBTL | Non-add code/Time display/Subtotal key |
| CA/AT/NS | Total/Amount tender/Non Sale key |

## 4. MODE SWITCH

### 1) LAYOUT

• Rotary type




The mode switch can be operated by inserting one of the two supplied mode keys - manager (MA) and operator (OP) keys. These keys can be inserted or removed only in the “REG” or “OFF” position.

The mode switch has these settings:

**OFF:** This mode locks all register operations. (AC power turns off.) No change occurs to register data.

**OP X/Z:** To take individual clerk X or Z reports, and to take flash reports.

It can be used to toggle receipt state “ON” and “OFF” by pressing he [RCP/PO] key.

**REG:** For entering sales.

**PGM:** To program various items.

**VOID:** Enters into the void mode. This mode allows correction after finalizing a transaction.

**MGR:** For manager’s entries. The manager can use this mode for an override entry.

**X1/Z1:** To take the X/Z report for various daily totals.

**X2/Z2:** To take the X/Z report for periodic (weekly or monthly) consolidation.

## 5. DISPLAY

### 1) OPERATOR DISPLAY

Display device : LED numeric display

Number of line : 1 line

Number of positions : 10 positions numeric display

Color of display : Yellow / Green

Character form : 7 segment + DP

Character size : Numeric 14.2 (H) x 7.9 (W) mm

**Layout:**

0 . 1 . 2 . 3 . 4 . 5 . 6 . 7 . 8 . 9 .

### 2) CUSTOMER DISPLAY

Display device : LED

Number of line : 1 line

Number of positions : 7 positions

Color of display : Yellow / Green

Style : Pop up type

Character form : 7 segment + Dp

Character size : 14.2mm (H) x 7.9mm (W)

**Layout:**

3 . 4 . 5 . 6 . 7 . 8 . 9 .

**Segment**

| | Display position | Description |
|---|---|---|
| Amount | 1-8 | |
| Minus sign | 2-10 | -: Floating |
| Error | 8-10 | Exx:xx = error code |
| PGM Mode | 10 | P |
| CASH, CHECK, CHARGE | 10 | F: Light up when a registration is finalized by depressing CASH, CHECK, CHARGE key |
| SUB TOTAL/ short tender | 10 | o |
| Change | 10 | C: Light up whenever the change due amount appears in the display. |
| Currency Conversion | 10 | c: Light up whenever the foreign amount appears in the display. |
| Department | 9-10 | No zero-suppressed |
| PLU | 7-10 | No zero-suppressed |
| Repeat | 8 | Endless count, starting from 2. |
| Receipt OFF | 9 | _ |
| DC | | _: Double size character entry status |
| SHIFT | | _: Shift character entry status |
| NUMBER | | _: Number character entry status |
| Clerk No. | 2, 3 | -xx-: clerk number |
| EJ FULL | 8-10 | E-E: Light up when EJ memory is FULL at the timing of key entry (by PGM selection). |
| Low Battery | 10 | L: |
| No Battery | 10 | L: |

**Decimal Point**

| | Display position | Description |
|---|---|---|
| Decimal point | 7-1 | |
| TAB | 4-1 | |
| EJ near full | 8, 9 | (by PGM selection) |

# 6. PRINTER

## 1) Printer

- Part number : M-T51
- NO. of station : 1 (Receipt of journal)
- Validation : No.
- Printing system : Line thermal
- No. of dot : 288 dots
- Dot pitch : Horizontal 0.167mm
  Vertical 0.174mm
- Font : 10 dots (W) × 24 dots (H)
- Printing capacity : max. 24 characters
- Character size : 1.67mm (W) × 4.17mm (H) at 10 × 24 dots
- Print pitch : Column distance 2.0mm
  Row distance 5.21mm
- Print speed : Approximate 52mm/s (Approximate 10 l/s)
- Paper feed speed : Approximate 52mm/s (Approximate 10 l/s)
  (Manual feed) : Approximate 52mm/s (Approximate 10 l/s)
- Reliability : Mechanism LIFE 6 million lines used to high-quality thermal paper
- Paper end sensor : Set up
- Cutter : Manual Cutter
- Near end sensor : No

## 2) Paper

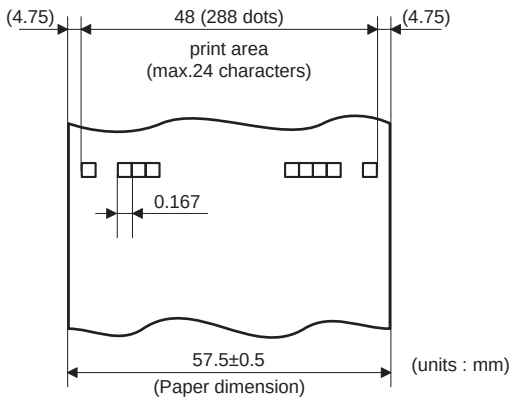
- Paper roll dimension : 57.5 ± 0.5mm in width
  Max. 80mm in diameter
- Paper quality : High-quality thermal paper
  paper thickness: 0.06 to 0.08mm
  Nihon seisi thermal paper : TF50KS-E
  Oji thermal paper : PD150R, PD160R

## 3) Logo stamp

- No

## 4) Printing area

Number of thermal head heater elements 288 dots



# 7. DRAWER

## [OUTLINE]

- Standard equipment: Yes (1)
- Max. number of additional drawers: 1
- The drawer consists of:
  1) Drawer box (outer case) and drawer
  2) Money case
  3) Coin case
  4) Lock (attached to the drawer)

## [SPECIFICATION]

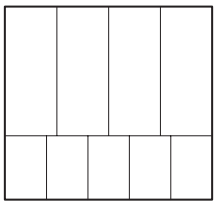
### 1) DRAWER BOX AND DRAWER

| | |
|---|---|
| Model name of the drawer box | SK415 |
| Size | 330 (W) x 418 (D) x 98 (H) mm<br>13 (W) x 16.5 (D) x 3.9 (H) inches |
| Material | Metal |
| Bell | – |
| Release lever | Standard equipment: situated at the bottom |
| Drawer open sensor | – |
| Separation from the main unit | – |

### 2) MONEY CASE

| | |
|---|---|
| Separation from the drawer | Disallowed |
| Separation of the bill compartments from the coin compartments | Allowed |
| Bill separator | – |
| Number of compartments | 4B/5C |

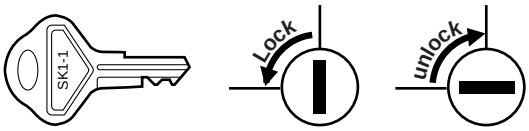
**Layout:**



4B/5C

### 3) LOCK (LOCK KEY : LKGIM7331BHZZ)

- Location of the lock: Front
- Method of locking and unlocking:
  To lock, insert the drawer lock key into the lock and turn it 90 degrees counter clockwise.
  To unlock, insert the drawer lock key and turn it 90 degrees clockwise.
- Key No: SK1-1




# 8. BATTERY

### 1) MEMORY BACK UP BATTERY

For memory back up, the dry battery AA (3 pieces) are needed.

1. Memory holding time:

   Approx. 1 year after New dry batteries are installed.

2. Battery exchange method:

   When the low battery symbol “L” lights up, replace the batteries (3 AA) by the following method;

   1) Power on the ECR.
   2) Mode switch turn to “REG” mode.
   3) Remove the OLD dry batteries (3 pieces).
   4) Insert the NEW dry batteries (3 pieces).
   5) Confirm the low battery symbol “L” is off.

### 2) LOW BATTERY

Low battery indication will appear on the left side of display when the battery voltage is low.

**CASE 1:** When any numeric entry & any item entry is not done or just after finalization.

The machine can indicate the low battery condition. (Always)

**CASE 2:** When numeric entry or item entry is done.

Battery condition will not appear.
Exceptionally, when the power is restored after a power failure, the low battery condition will appear on the display only when the battery is low.
And the indicator will disappear after any key entry.

**[Display sample]**

“ 0.00” : Battery is OK.
“L 0.00” : Low battery (You have to change the batteries.)
“ʟ 0.00” : No battery (You have to change the batteries immediately.)

After finalization

“F 12.34” : Battery is OK.
“L 12.34” : Low battery. (“L” indicate instead of “F”.)
“ʟ 12.34” : No battery. (‘ʟ” indicate instead of “F”.)

Note: “NO BATTERY”: When the “NO BATTERY” is display, the master reset is executed at the timing of “POWER ON” after the “POWER OFF”.

# CHAPTER 2. OPTIONS

## 1. OPTIONS (No)

## 2. SERVICE OPTIONS (No)

## 3. SUPPLIES

| NO | NAME | PARTS CODE | PRICE RANK | DESCRIPTION |
|---|---|---|---|---|
| 1 | Thermal roll paper | TPAPR6656RC05 | BA | 5 ROLLS/PACK 70 ϕ |

## 4. SPECIAL SERVICE TOOLS

| NO | NAME | PARTS CODE | PRICE RANK | DESCRIPTION |
|---|---|---|---|---|
| 1 | RS-232 Loop-back connector | UKŌK−6705RCZZ | BU | |
| 2 | POS tools (IPL Software) | UKŌG−2360BHZZ | | |

# CHAPTER 3. MASTER RESET AND PROGRAM RESET

## 1. MASTER RESETTING

Master resetting clears the entire memory and resumes initial values.

Master resetting can be accomplished by using the following procedure:

Procedure A:
1) Plugin the AC cord to the wall outlet.
2) Set the mode switch to REG position.
3) Let the ECR be witout the memory backup battery.
4) Unplug the AC cord from the wall outlet.
5) Wait over 1 minute for discharging.
6) Plugin the AC cord to the wall outlet.

The master reset can also be accomplished in the following case.

In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

(This is because if power failure occurs with no battery attached to the machine, all the memories are lost and the machine does not work properly after power recovery; this requires the master reset operation.)

## 2. PROGRAM RESETTING (INITIALIZATION)

This resetting resumes the initial program without clearing memory.

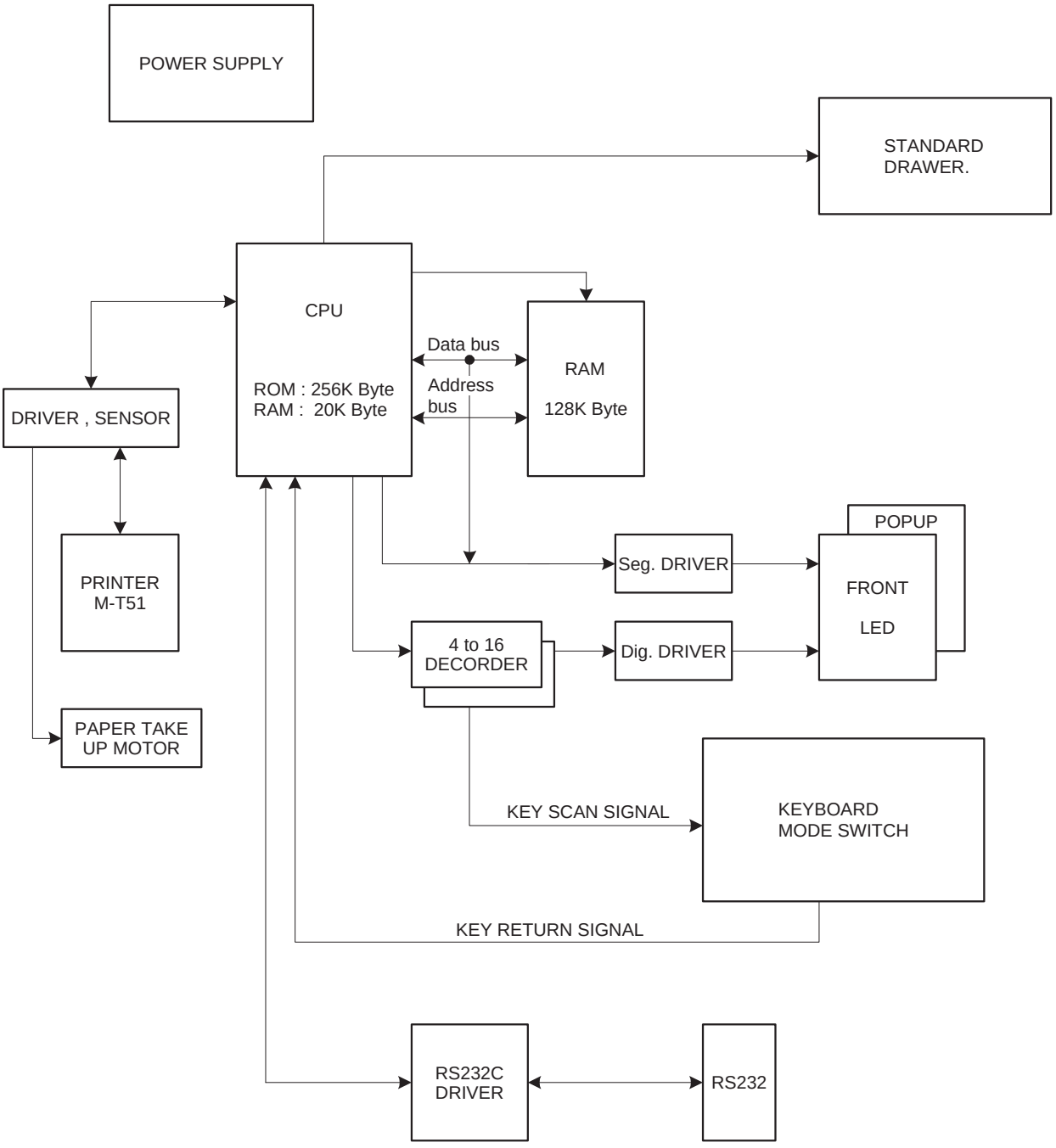
This resetting can be operated at below sequence in PGM mode.

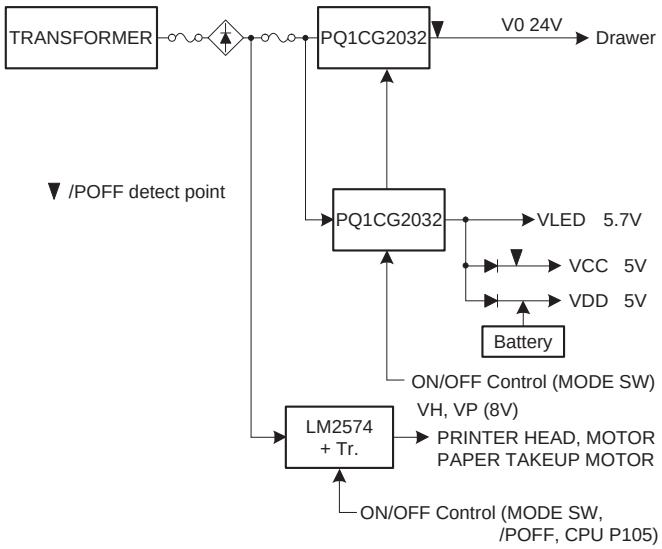
Procedure:
1) Unplug the AC cord from the wall outlet.
2) Wait over 1 muinite for discharging.
3) Set the mode switch to the PGM position.
4) While holding down the FEED key, plugin the AC cord to the wall outlet.

Note: In case power failure occurs when the machine has no battery attached to it, the master reset operation is automatically performed after the power has been restored.

# CHAPTER 4. HARDWARE DESCRIPTION

## 1. HARDWARE BLOCK DIAGRAM

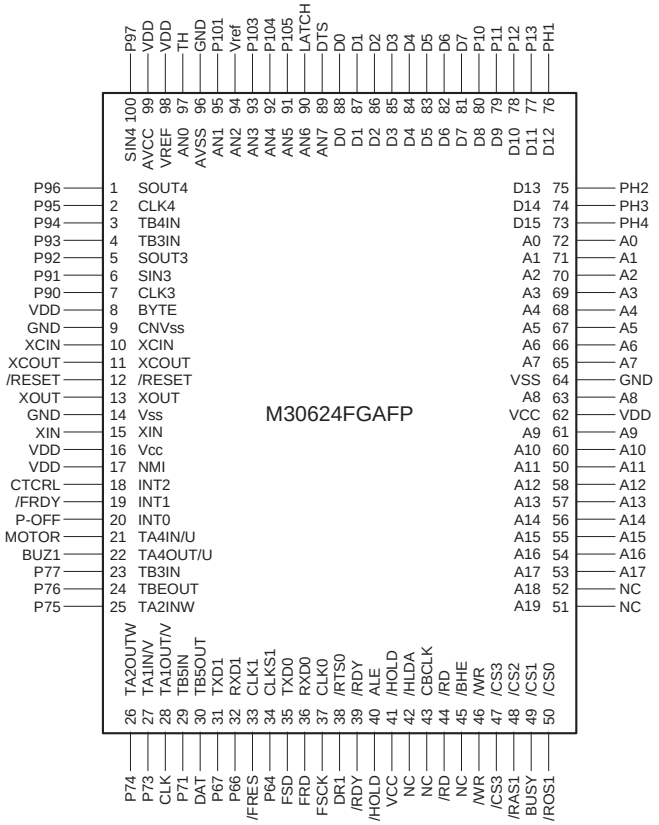





# 2. DESCRIPTION OF MAIN LSI'S

## 2-1. CPU (M30624FGAFP)

### 1) Pin configuration



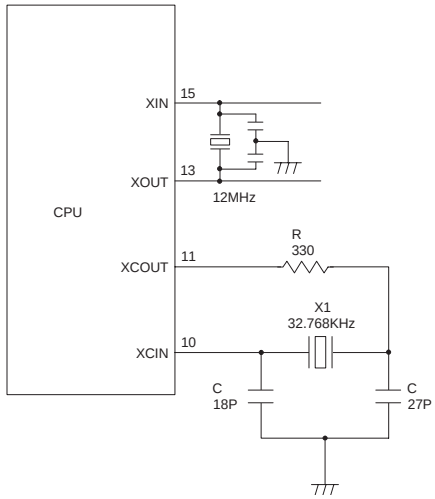

### 2) Pin description

| Pin No. | SYMBOL | SIGNAL NAME | In/ Out | Function |
|---|---|---|---|---|
| 1 | SOUT4 | P96 | In | Key IN |
| 2 | CLK4 | P95 | In | Key IN |
| 3 | TB4IN | P94 | In | Key IN |
| 4 | TB3IN | P93 | In | Key IN |
| 5 | SOUT3 | P92 | In | Key IN |
| 6 | SIN3 | P91 | In | Key IN |
| 7 | CLK3 | P90 | In | Key IN |
| 8 | BYTE | VDD | In | VDD |
| 9 | CNVss | CNVss | In | Normal : L Booting : H |
| 10 | XCIN | XCIN | In | Calender clock :32.768KHz |
| 11 | XCOUT | XCOUT | In | Calender clock :32.768KHz |
| 12 | /RESET | /RESET | In | Reset |
| 13 | XOUT | XOUT | Out | Open |
| 14 | Vss | Vss | In | Vss |
| 15 | XIN | XIN | In | System clock |
| 16 | Vcc | VDD | In | VDD |
| 17 | NMI | P85 | In | Not used |
| 18 | INT2 | P84 | Out | PRINTER/STB2 |
| 19 | INT1 | /RDY | In | NU FMC (/RDY) |
| 20 | INT0 | P-OFF | In | Power off |
| 21 | TA4IN/U | MOTOR | Out | Paper take up motor drive |
| 22 | TA4OUT/U | BUZ1 | Out | Buzzer drive |
| 23 | TB3IN | P77 | In | RS232 :DR |
| 24 | TBEOUT | P76 | In | RS232 :CS |
| 25 | TA2INW | P75 | In | RS232 :CD |
| 26 | TA2OUTW | P74 | Out | RS232 :ES |
| 27 | TA1IN/V | P73 | Out | Drawer drive 2 |
| 28 | TA1OUT/V | CLK2 | Out | Printer data clock |
| 29 | TB5IN | P71 | Out | NU FMC (BUSY) |
| 30 | TB5OUT | TXD2 | Out | Print data |
| 31 | TXD1 | P67 | Out | RS232 :SD |
| 32 | RXD1 | P66 | In | RS232 :RD |
| 33 | CLK1 | /FRES | Out | NU FMC (/FRES) |
| 34 | CTS1/RTS1 | P64 | Out | RS232 :RS |
| 35 | TXD0 | FSD | Out | FMC :Send data |
| 36 | RXD0 | FRD | In | FMC :Receive data |
| 37 | CLK0 | FSCK | Out | FMC :Shift clock |
| 38 | /RTS0 | DR1 | Out | Drawer drive 1 |
| 39 | CLKOUT | /RDY | In | /RDY (CGROM) |
| 40 | ALE | NC | Out | NOT USE |
| 41 | /HOLD | /HOLD | In | /BOOT MODE |
| 42 | /HLDA | NC | Out | NOT USE |
| 43 | CBCLK | BCLK | Out | BCLK |
| 44 | /RD | /RD | Out | Read |
| 45 | /BHE | NC | Out | NOT USE |
| 46 | /WR | /WR | Out | Write |
| 47 | /CS3 | CS3 | Out | Display segment latch |
| 48 | /CS2 | /CS2 | Out | Chip select :for RAM |
| 49 | /CS1 | /CS1 | Out | EPM Control |
| 50 | /CS0 | /CS0 | Out | Chip select :for ROM |
| 51 | A19 | A19 | Out | Address bus :19 |
| 52 | A18 | A18 | Out | Address bus :18 |

| Pin No. | SYMBOL | SIGNAL NAME | In/ Out | Function |
|---|---|---|---|---|
| 53 | A17 | A17 | Out | Address bus :17 |
| 54 | A16 | A16 | Out | Address bus :16 |
| 55 | A15 | A15 | Out | Address bus :15 |
| 56 | A14 | A14 | Out | Address bus :14 |
| 57 | A13 | A13 | Out | Address bus :13 |
| 58 | A12 | A12 | Out | Address bus :12 |
| 59 | A11 | A11 | Out | Address bus :11 |
| 60 | A10 | A10 | Out | Address bus :10 |
| 61 | A9 | A9 | Out | Address bus :9 |
| 62 | VCC | VDD | In | VDD |
| 63 | A8 | A8 | Out | Address bus :8 |
| 64 | VSS | VSS | In | VSS |
| 65 | A7 | A7 | Out | Address bus :7 |
| 66 | A6 | A6 | Out | Address bus :6 |
| 67 | A5 | A5 | Out | Address bus :5 |
| 68 | A4 | A4 | Out | Address bus :4 |
| 69 | A3 | A3 | Out | Address bus :3 |
| 70 | A2 | A2 | Out | Address bus :2 |
| 71 | A1 | A1 | Out | Address bus :1 |
| 72 | A0 | A0 | Out | Address bus :0 |
| 73 | P17 | ENA2 | Out | Paper feed motor :ENA2 |
| 74 | P16 | ENA1 | Out | Paper feed motor :ENA1 |
| 75 | P15 | IN2 | Out | Paper feed motor :IN2 |
| 76 | P14 | IN1 | Out | Paper feed motor :IN1 |
| 77 | P13 | P13 | Out | Key/Display |
| 78 | P12 | P12 | Out | Key/Display |
| 79 | P11 | P11 | Out | Key/Display |
| 80 | P10 | P10 | Out | Key/Display |
| 81 | D7 | D7 | InOut | Data bus :7 |
| 82 | D6 | D6 | InOut | Data bus :6 |
| 83 | D5 | D5 | InOut | Data bus :5 |
| 84 | D4 | D4 | InOut | Data bus :4 |
| 85 | D3 | D3 | InOut | Data bus :3 |
| 86 | D2 | D2 | InOut | Data bus :2 |
| 87 | D1 | D1 | InOut | Data bus :1 |
| 88 | D0 | D0 | InOut | Data bus :0 |
| 89 | AN7 | STB1 | Out | Printer head strobe |
| 90 | AN6 | LATCH | Out | Printer data latch |
| 91 | AN5 | P105 | Out | Printer head voltage ON |
| 92 | AN4 | P104 | Out | CG ROM Bank |
| 93 | AN3 | P103 | In | VBAT |
| 94 | AN2 | Vref | In | NU Vret |
| 95 | AN1 | P101 | In | Printer head voltage check |
| 96 | AVSS | VSS | In | VSS |
| 97 | AN0 | TH | In | Print head temperature check |
| 98 | VREF | VDD | In | VDD |
| 99 | AVCC | VDD | In | VDD |
| 100 | SIN4 | P97 | In | Key IN |

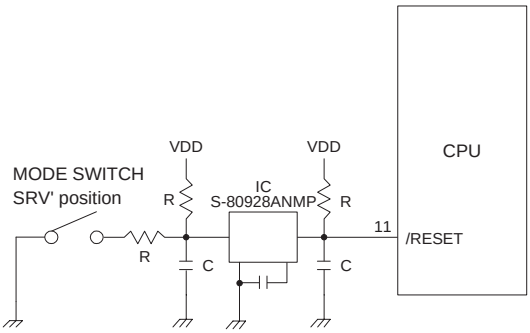
# 3. CLOCK GENERATOR

### 1) CPU




Two oscillators are connected to the CPU.
The basic clock X2 is supplied from a 12MHz oscillator.
If the CPU was not operating properly, the signal does not appear on this line in most cases.
The sub-clock X1 generates 32.768KHz which is primarily used to update the internal RTC (real time clock).
During the standby mode, it keeps oscillating to update the clock and monitoring the power recovery.

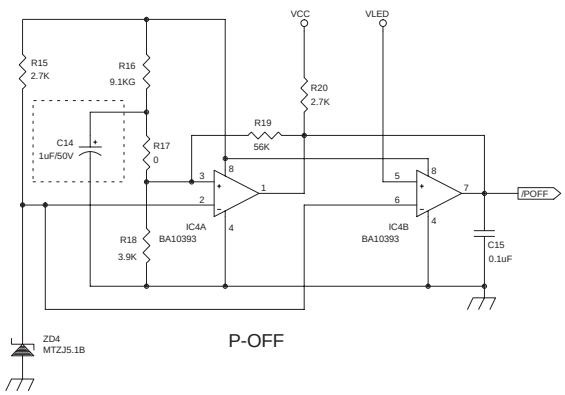
# 4. RESET CIRCUIT




(1) When the mode switch is placed in the “SRV” position, the reset signal is sent to the CPU to reset the hardware.

(2) When VDD ≦ 2.8V, a reset signal is outputted from the reset IC. (S-80928ANMP)

# 5. P-OFF CIRCUIT



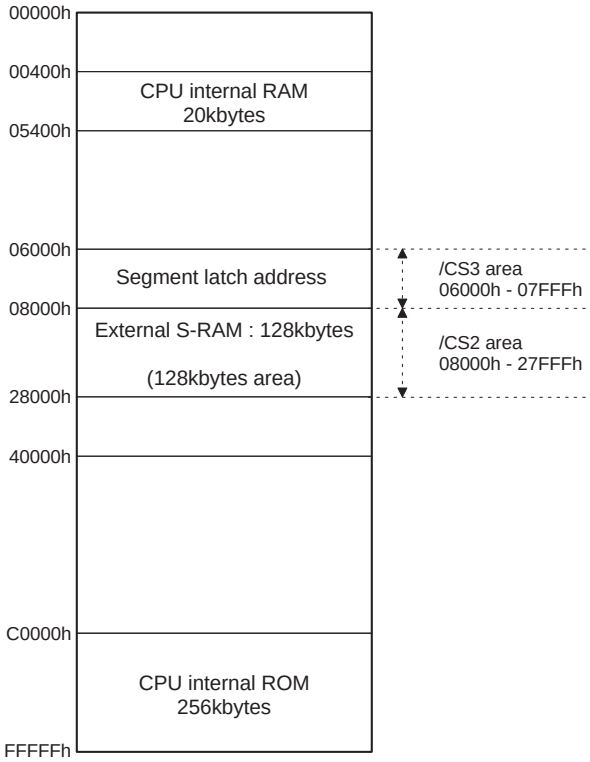
The P-OFF signal detects two signals by two comparators and sent to the CPU.

V0 (24V) signal: If the power voltage V0 (24V) falls bellow the specified level, the P-OFF signal is driver to LOW by the comparator ICAA.

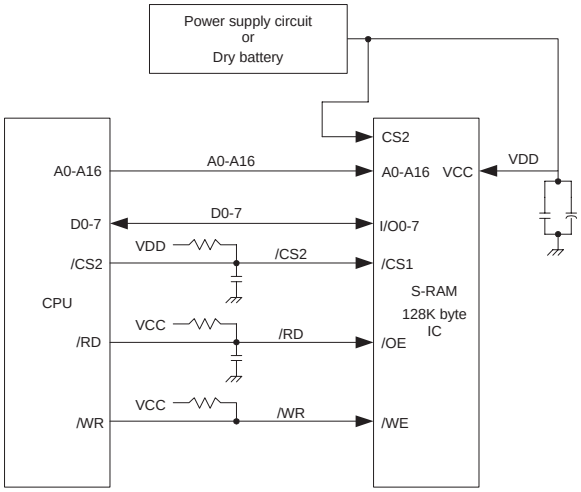
VLED signal: If the LED/Logic power voltage VLED falls below the specified level, the P-OFF signal is driven to LOW by the comparator IC4B.

# 6. MEMORY CIRCUIT

## 1) Address map

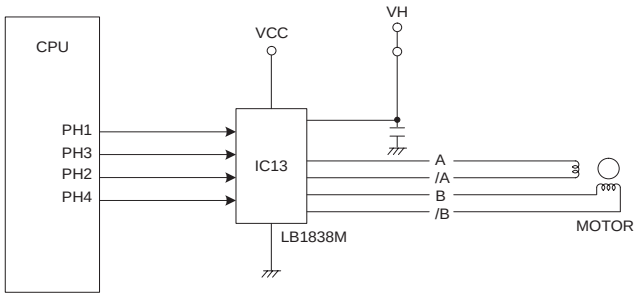



## 2) RAM control




# 7. PRINTER CONTROL CIRCUIT

## 1) Paper feed motor circuit




Stepping motor control

The 2-phase, bi-polar stepping motor is driven at a constant voltage by LB1838M (made by SANYO).

1 step: 0.087mm

1 dot: 2 steps

### CPU port

| No. | CPU port | Signal used |
|---|---|---|
| 76 | P14 | IN1 |
| 75 | P15 | IN2 |
| 74 | P16 | ENA1 |
| 73 | P17 | ENA2 |

### Drive step

| | Driver IC input (CPU output) | | | | Motor drive signal | | | |
|---|---|---|---|---|---|---|---|---|
| STEP | IN1 | IN2 | ENA1 | ENA2 | A (OUT1) | B (OUT3) | /A (OUT2) | /B (OUT4) |
| 1 | L | L | H | H | H | H | L | L |
| 2 | H | L | H | H | L | H | H | L |
| 3 | H | H | H | H | L | L | H | H |
| 4 | L | H | H | H | H | L | L | H |

## 2) Print circuit

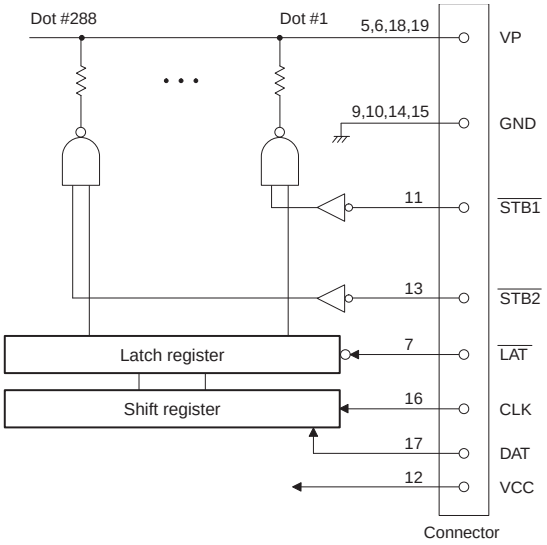
#### Thermal head configuration

As shown in the equivalent circuit in the figure, thermal head consists of heating elements and head drivers which drives and controls those heating elements.

The serial print data input through the DATA IN (D1) is transferred to the shift register synchronizing with the CLOCK (CP) and stored in the latch register by the LATCH (LA) signal.

The head conduction signals (print commands 1 ~ 6) turn the gate on to conduct the heating element corresponding to the print data.

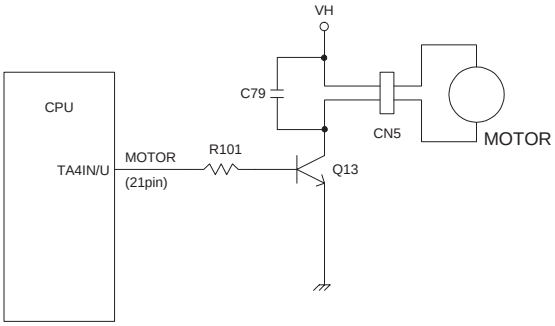
**Thermal head block daigram**




**Thermal head strobe terminals**

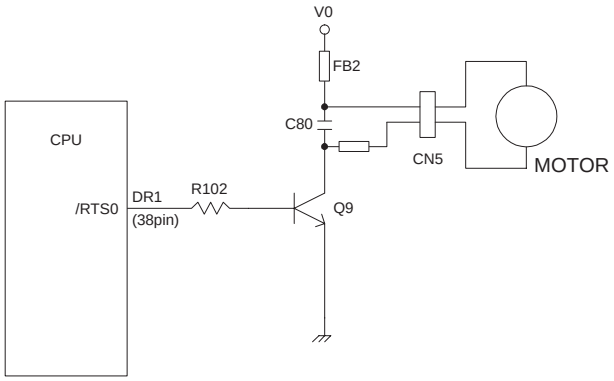
| STB No. | Dot No. | Number of dots |
|---|---|---|
| 1 | 1 ~ 144 | 144 |
| 2 | 145 ~ 288 | 144 |

## 8. PAPER TAKE UP MOTOR DRIVE CIRCUIT



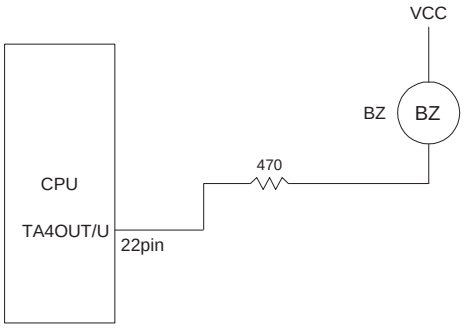

When the MOTOR signal from the CPU is HIGH, Q1 is turned on to operate the motor.

## 9. DRAWER DRIVE CIRCUIT



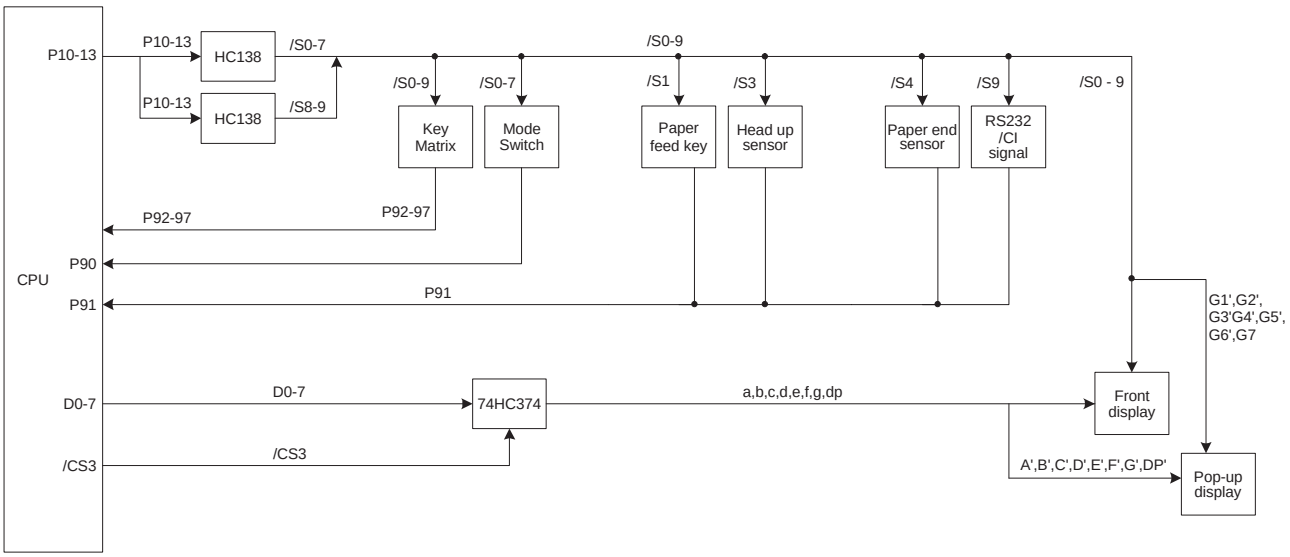

When the DR1 signal from the CPU is HIGH, Q9 is turned on to operate the solenoid.

## 10. BUZZER DRIVE CIRCUIT




When the pulse signal (about 4KHz) is generated from the CPU, the buzzer sounds.

## 11. KEYBOARD CIRCUIT




Four P10-13 signals from the CPU are converted into 16 strobe signals by two 74HC138 for use in various functions.

### 1) Keyboard

Scan signal: 10 /S0-9 signals

Return signal: 6 P92-97 signals

The keys are read by the key matrix following the above signals.

### 2) Mode switch

Scan signal: 8 /S0-7 signals

Return signal: 1 P90 signal

The positions are read by the above signals.

| Scan signal | /S0 | /S1 | /S2 | /S3 | /S4 | /S5 | /S6 | /S7 |
|---|---|---|---|---|---|---|---|---|
| Mode switch position | SRV | PGM | (OFF) | TIME | REG | MGR | X1/Z1 | X2/Z2 |

### 3) Paper feed key

Scan signal: 1 /S1 signal

Return signal: 1 P91 signal

The paper feed key is read by the above signals.

### 4) Head up sensor

Scan signal: 1 /S3 signal

Return signal: 1 P91 signal

The Head up sensor state is read by the above signals.

| Head up sensor | Head up detected | Head up not detected |
|---|---|---|
| P91 | Low | High |

### 5) Paper end sensor

Scan signal: 1 /S4 signal

Return signal: 1 P91 signal

The paper end sensor state is read by the above signals.

| Receipt near end sensor | Near end detected | Near end not detected |
|---|---|---|
| P91 | Low | High |

### 6) RS232/CI signal detection

Scan signal: 1 /S9 signal

Return signal: 1 P91 signal

The RS232/CI signal is detected by the above signals.

| RS232 /CI signal | /CI signal detected | /CI signal not detected |
|---|---|---|
| P91 | Low | High |

### 7) Display

Scan signal: 10 /S0-9 signals

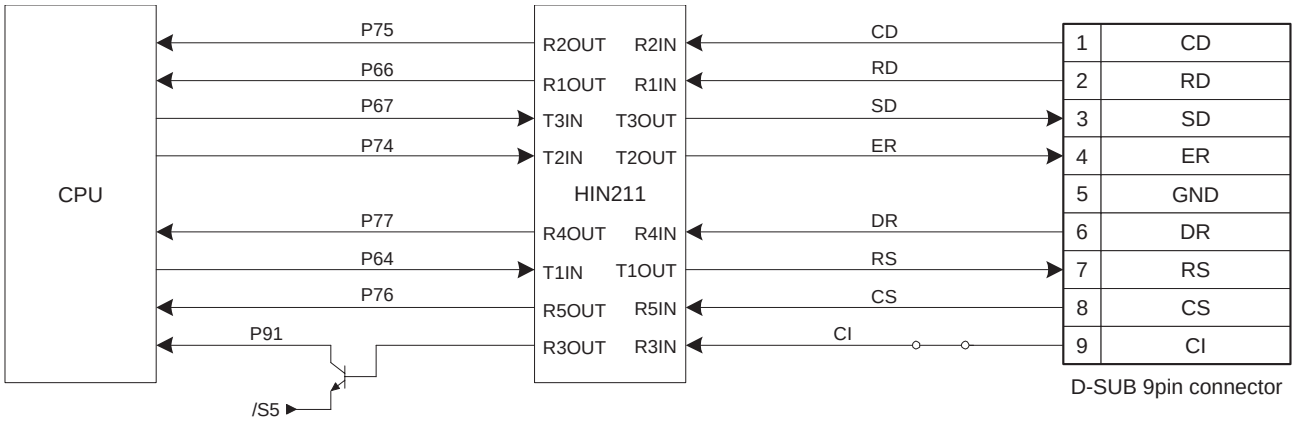
The above 10 scan signals are used as the following digit signals.

Digit signal:

| Scan signal | /S0 | /S1 | /S2 | /S3 | /S4 | /S5 | /S6 | /S7 | /S8 | /S9 |
|---|---|---|---|---|---|---|---|---|---|---|
| Digit signal: Front | G1' | G2' | G3' | G4' | G5' | G6' | G7' | G8' | G9' | G10' |
| Digit signal: Pop-up | G1' | G2' | G3' | G4' | G5' | G6' | G7' | | | |

Segment signal : Segment signals: a, b, c, d, e, f, g, and DP are output by the IC:74HC374, using the data bus signal:D0-7 from the CPU as an input signal and the chip select signal:/CS3 as a latch signal.

## 12. RS232 CIRCUIT




The signals from the CPU are converted by the HIN211 into the RS232 level to input and output them.

# CHAPTER 5. TEST FUNCTION

## 1. TEST ITEMS

The test items are as follows:

| NO. | Code | Description |
|---|---|---|
| 1 | 100 | Display buzzer test |
| 2 | 101 | Key code |
| 3 | 102 | Printer test |
| 4 | 104 | Keyboard test |
| 5 | 105 | mode switch test |
| 6 | 106 | Printer sensor test |
| 7 | 107 | Clock display test |
| 8 | 110 | Drawer 1 open & sensor test |
| 9 | 120 | External RAM test |
| 10 | 121 | CPU internal RAM test |
| 11 | 140 | CPU internal ROM test |
| 12 | 160 | AD conversion port test |
| 13 | 500 | RS232C test |
| 14 | 550 | Sleep mode test |

## 2. DESCRIPTION OF EACH DIAGNOSTIC PROGRAM

### 1) DISPLAY BUZZER TEST

① Key operation

100 ⟶ RCPT/PO

② Test procedure

Display at operator side 1.2.3.4.5.6.7.8.9.0.
Display at front side 4.5.6.7.8.9.0.

The decimal point will shift in steps of 1 digit from the lower digit to the upper (every 200 m sec).

After that, all segments turn on (about 1 sec)

Display at operator side 8.8.8.8.8.8.8.8.8.8.
Display at front side 8.8.8.8.8.8.8.

This mode is repeated.
At the same time, the buzzer sounds continuously.

③ Check that:

A) Each position is correctly displayed.

B) The brightness of each number is uniform.

C) The buzzer sound is normal.

④ End of testing

You can exit the test mode by pressing any key. The following is printed.

1 0 0

### 2) KEY CODE

① Key operation

101 ⟶ RCPT/PO

② Test procedure

Display ◯◯◯
KEY CODE

③ Check that:

KEY code: Every time a key is pressed, the code of that key is displayed as a decimal number.

When a key is pressed twice or pressed in an incorrect manner, --- will be displayed.

④ End of testing

You can exit the test mode by turning the mode switch to a position other than the SRV mode. The printer prints as follows:

1 0 1

### 3) PRINTER TEST

① Key operation

102 ⟶ RCPT/PO

② Test procedure

Display 1 2 3 4 5 6 7 8 9 0

```
ZZZZZZ  ----------ZZZZZ
ZZZZZZ  ----------ZZZZZ
ZZZZZZ  ----------ZZZZZ
```

3 lines of 24 Z's are printed.

③ Check that:

The print is free from contamination, blur, and uneven density.

④ End of testing

The test will end automatically.

### 4) KEYBOARD TEST

① Key operation

104 ⟶ RCPT/PO

② Test procedure

The keyboard is checked using the sumcheck data of the key code.

Display 1 0 4 ◯◯◯
KEY CODE

③ Check:

A) The content of completion print

④ End of testing

When the test ends normally 104
When an error occurs E- ~ - 104

Note: Calculation of key sumcheck data
The hard code (hexadecimal number) at the position (excluding feed key) where there is an input data contact is added.
However, the end key (CA/AT/NS) is not added.
This data to which hard codes have been added is converted into a decimal number value, which will become the sumcheck data that will be entered when the Diag is started.

## 5) MODE SWITCH TEST

① Key operation

105 ⟶ RCPT/PO

② Test procedure

Display 1 0 5 X

MODE: _PGM_VOID_OFF_OP X/Z_REG_MGR_X1/Z1_X2/Z2____PGM
x : 1 2 9 3 4 5 6 7 1

The above x must be read in the correct order. (If the contact is open, 9 will be displayed.)

③ Check:

The display during testing and the content of the completion print.

④ End of testing

When the test ends normally: 105
When an error occurs: E- ~ - 105

## 6) PRINTER SENSOR TEST

① Key operation

106 ⟶ RCPT/PO

② Test procedure

Check the status of paper end sensor and head up sensor.

7-segment display: 1 0 6 X Y

③ Check the following:

X:1 - Paper present Y:1 - Head DOWN
O - Out of paper O - Head UP

④ End of testing

You can exit the test mode by pressing any key and the printer prints the following:

1 0 6

## 7) CLOCK TEST

① Key operation

107 ⟶ RCPT/PO

② Test procedure

Displayed digit: 8 7 6 5 4 3 2 1

7-segment display: ∗ ∗ − ∗ ∗ ∗ ∗

hour min sec

Blinks at an interval of 0.5 sec.

③ Check that:

"-" blinks and the clock counts up.

④ End of testing

When any key is pressed, the date and time are printed and the test mode will terminated.

Display 1 0 6 XXXXXX - XXXXXX

year month day hour min sec

## 8) DRAWER 1 OPEN AND SENSOR TEST

① Key operation

110 ⟶ RCPT/PO

② Test procedure

Display 1 1 0 X

X: O = DRAWER OPEN
C = DRAWER CLOSED

③ Check that:

A) The drawer opens normally.

B) The sensor correctly indicates the status of the drawer 1.

∗ On the XE-A201, "C" (CLOSED) is always displayed.

④ End of testing

You can exit the test mode by pressing any key. The printer prints the following.

1 1 0

## 9) EXTERNAL RAM TEST

① Key operation

120 ⟶ RCPT/PO

② Test procedure

The standard 128 Kbyte RAM is checked.
The contents of the memory are lost after this test.
RAM(08000H ~ 27FFFH area) is tested in the following procedure:

a) Data in the test area is stored.

b) Write "00H"

c) Read and compare "00H" and then write"55H"

d) Read and compare "55H" and then write"AAH"

e) Read and compare "AAH"

f) Restore stored data.

If an error occurs at a step, the error is printed.
If an error does not occur, the following addresses are checked.

Addresses to be checked:
10000H , 10001H , 10002H , 10004H , 10008H
10010H , 10020H , 10040H , 10080H ,
10100H , 10200H , 10400H , 10800H ,
11000H , 12000H , 14000H , 18000H ,
20000H

Display 1 2 0

③ Check:

A) The completion print.

④ End of testing

The program ends after printing.

When the test ends normally. 120
When the test ends abnormally. Ex- ~ - 120
*****
x = 1: Data error
x = 2: Address error

When an error occurs, the printer outputs the error message and then the address where the error has occurred in the area ****.

## 10) CPU internal RAM test

① Key operation

121 ⟶ RCPT/PO

② Test procedure

The test program checks internal RAM of the CPU.
The contents of the memory are lost after this test.
RAM (00400H - 053FFH area) is tested in the following procedure.

a) Data in the test area is stored.

b) Write “00H”

c) Read and compare “00H” and then write “55H”

d) Read and compare “55H” and then read “AAH”

e) Read and compare “AAH”

f) Stored data is restored.

If an error occurs at a step, the error is printed.
If an error does not occur, the following addresses are checked.
Addresses to be checked:

01000H , 01001H , 01002H , 01004H , 01008H
01010H , 01020H , 01040H , 01080H ,
01100H , 01200H , 01400H , 01800H ,
02000H , 04000H

Display 1 2 1

③ Check:

The completion print.

④ End of testing.

The test program ends after printing.

When the test ends normally. 121
When the test ends abnormally. Ex- ~ - 121
*****
x = 1: Data error
x = 2: Address error

If an error occurs, the printer outputs the error message and then the address where the error has occurred in the area ****.

## 11) CPU internal ROM test

① Key operation

140 ⟶ RCPT/PO

② Test procedure

The test program checks that the checksum of the CPU internal flash ROM (C0000H - FFFFFH) is correct.
The lower two digits of the checksum should be 10H.(pending)

Display 1 4 0

③ Check:

The completion print.

④ End of testing

The test will automatically be terminated and the printer prints as follows:

When the test ends normally. 140
ROM ******** (CPU CODE)
******** (Version)
When the test ends abnormally. E- ~ - 140
ROM ******** (CPU CODE)
******** (Version)

## 12) AD conversion port

① Key operation

160 ⟶ RCPT/PO

② Test procedure

The test program displays the voltage of each AD port.

1. Head temperature 1 6 0 1 XXX
2. Head voltage 1 6 0 2 XXX
3. Battery voltage 1 6 0 3 XXXX

③ End of testing

You can exit the test mode by pressing any key.
The printer prints the follwing.

1 6 0

## 13) RS232C test

Install the RS232C loopback connector. (UKOG-6705RCZZ)

① Key operation

500 ⟶ RCPT/PO

② Test procedure

Control signal check

| OUT PUT | | IN PUT | | | |
|---|---|---|---|---|---|
| /ER | /RS | /DR | /CI | /CD | /CS |
| OFF | OFF | OFF | OFF | OFF | OFF |
| OFF | ON | OFF | OFF | ON | ON |
| ON | OFF | ON | ON | OFF | OFF |
| ON | ON | ON | ON | ON | ON |

Data communication check
A loopback test of 256-byte data between SD-RD is performed.
DATA: $00 - $FF BAUD RATE: 9600 BPS

7-segment display: 5 0 0

③ Check:

The completion print.

④ End of testing

Completion print RS TEST OK
Error print RS TEST **NG**ERxx

| xx | Contents of the error | |
|---|---|---|
| 01 | ER DR error | |
| 02 | ER CI error | |
| 03 | RS CD error | |
| 04 | RS CD error | |
| 05 | SD RD error | DATA data |
| 06 | SD RD error | DATA error/framing error |

### 14) Sleep mode test

① Key operation

550 ⟶ RCPT/PO

② Test procedure

The test program checks the system in SLEEP MODE (The display goes off and the Decimal point comes on) and then waits for any status change (KEY input or RS PORT change).

③ Check that:

A) The display goes off (excluding Decimal point)

B) The system turns active when any key is pressed.

④ End of testing

The test program will automatically be terminated and the printer prints the following.

5 5 0

# CHAPTER 6. IPL (INITIAL PROGRAM LOADING) FUNCTION

The application program of the XE-A201 is written into the Flash ROM in the CPU.

Since the CPU supplied as a service part does not include the application program in it, the application program must be written when the CPU is replaced with a new one.

To write the application program into the Flash ROM, connect the PC and the XE-A201 with an RS-232C cable, and execute the PC software (PosUtilityTool2).

∗ Use the RS-232C cable provided together with the XE-A201 product, or use a D-Sub 9pin cross cable employed in conventional communication between ECR-ECR.

∗ PosUtilityTool2 includes the ROM data to be written into the CPU as well as the IPL program.

### [Related parts/Tool]

| PARTS NAME | PARTS CODE | LOCATION No. |
|---|---|---|
| CPU (without application program) | VHi30624FGA−1 | IC5 |
| PosUtilityTool2 | UKŌG−2360BHZZ | |

### [IPL PROCEDURE]

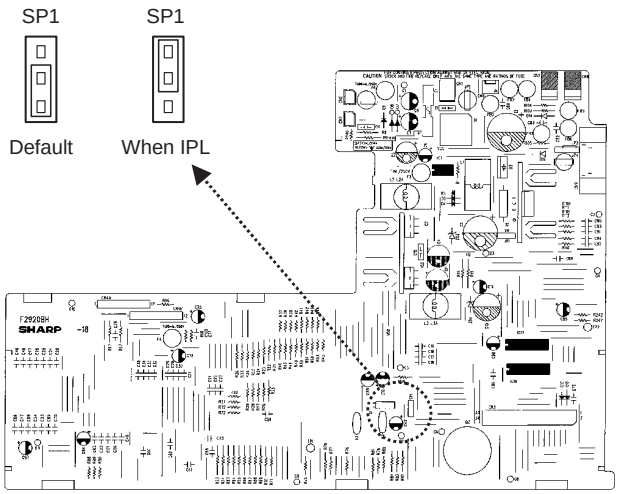
1) Connect the XE-A201 and PC with an RS-232C cable.

**<XE-A201 side>**

2) Turn off the AC Power. (& remove batteries.)

3) Open the cabinet.

4) Change the IPL JUMPER PIN (SP1) to the rear side.




<Main PWB>

5) Close the cabinet.

6) Turn on the AC Power.
(At this time, ECR looks like inactive, but ECR waits the ROM data from PC.)

**<IPL software on PC>**

7) Copy the following files in "PosUtilityTool2" into the hard disk of PC.

Postool2.exe

A201u.ROM

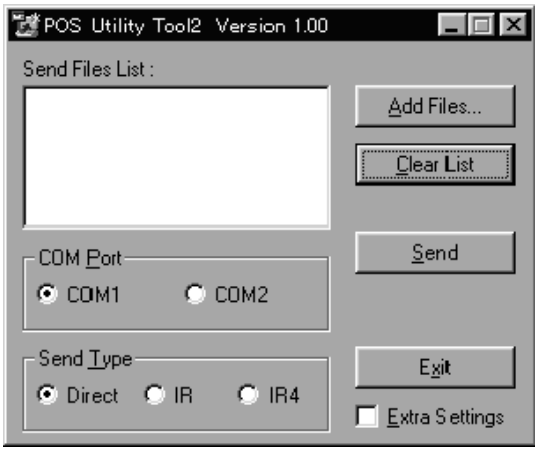
8) Boot "Postool2.exe."

9) Push [Add Files] in the screen.

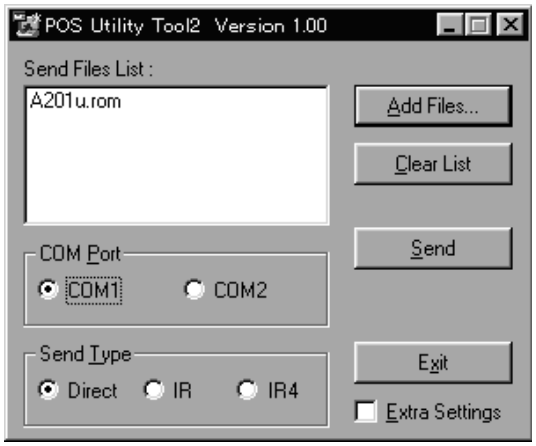
10) Select the ROM DATA file. (File name: A201u.ROM)

11) By pushing [Send] in the screen, the ROM data is sent from PC to ECR.
The address counter is shown on PC and counts up.

12) After about 3-minuites, the message "Complete" is shown on PC.




<After booting>




<After pushing "Add Files">

∗1 COM Port is selectable between COM1 and 2.

∗2 For "Send Type", select "Direct".

∗3 Do not select "Extra Setting".

**<XE-A201 side>**

12) Turn on the AC Power.

13) Open the cabinet.

14) Change the Jumper PIN (SP1) to the front side. (default position)

15) Close the cabinet.

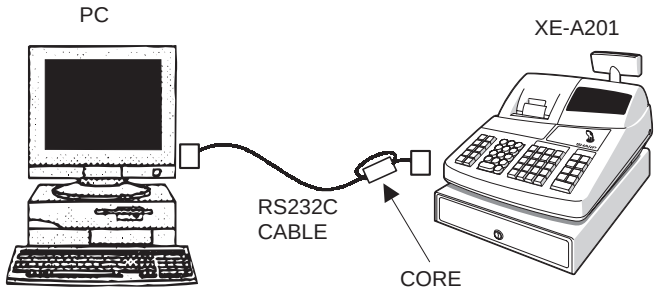
16) Turn on the AC Power.

Master Reset will be performed. If not, power off the XE-A201, wait 1miniute and turn on the power again.

# APPENDIX: RS232C CABLE

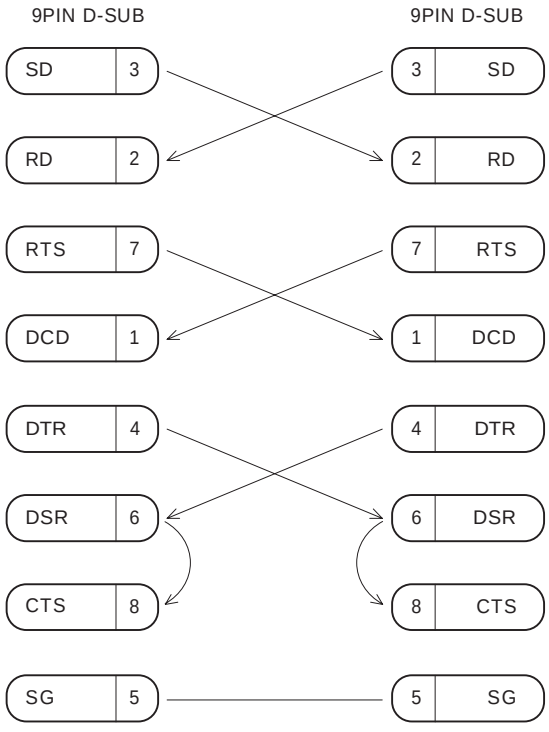
The RS-232C cable (QCNWG3190BHZZ) provided together with the XE-A201 is used to connect the XE-A201 and a PC when using the customer support tool or performing IPL.

When using the cable, connect the core side of the cable to the XE-A201 as shown in the figure below.




**The accessory RS-232C cable has the following internal connections:**

(Equivalent to a cross cable used in the conventional connection of ECR-ECR)



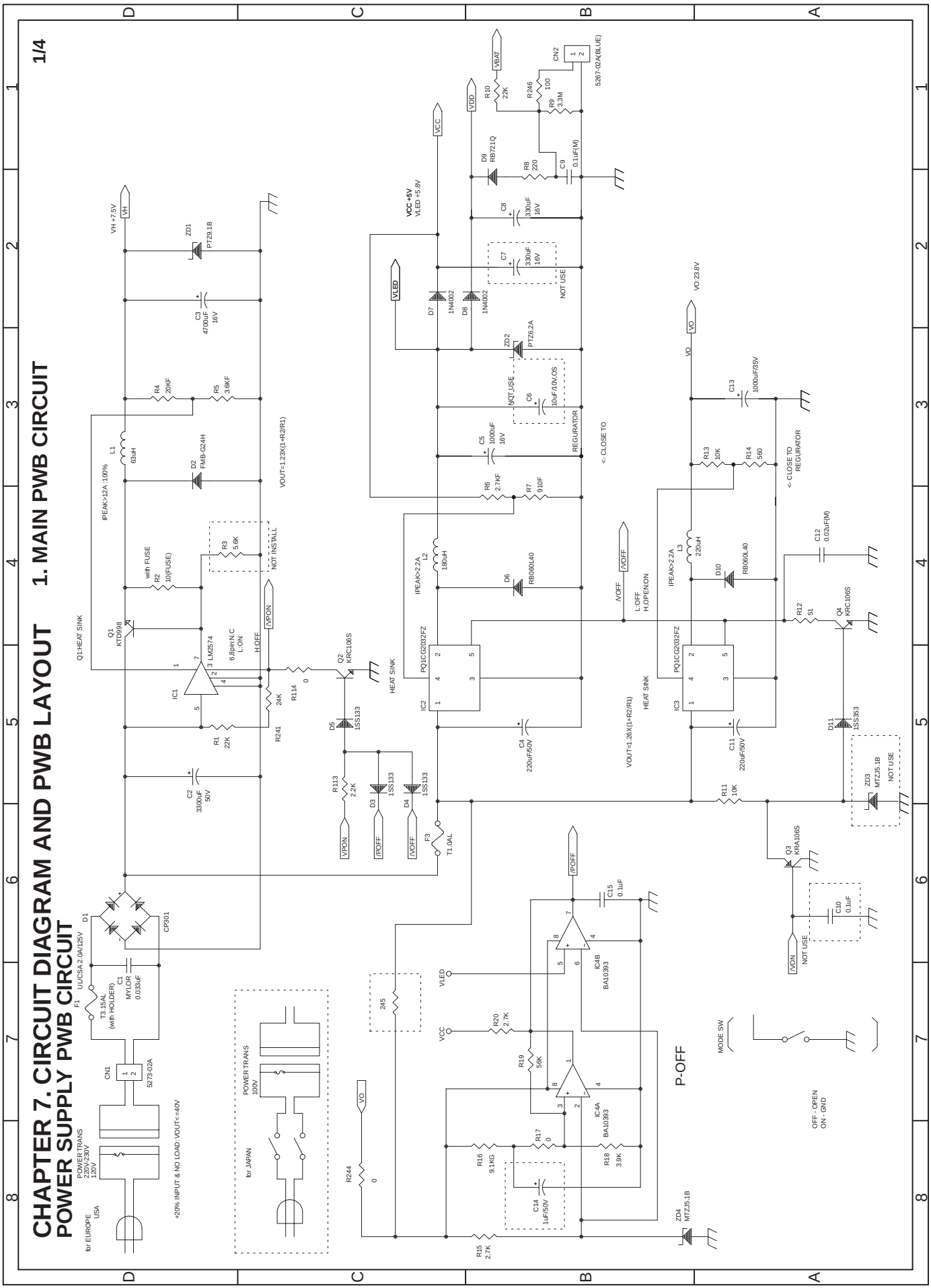

SD : TRANSMITTED DATA
RD : RECEIVED DATA
DTR : DATA TERMINAL READY
DSR : DATA SET READY
RTS : REQUEST TO SEND
DCD : DATA CARRIER DETECTOR
CTS : CLEAR TO SEND

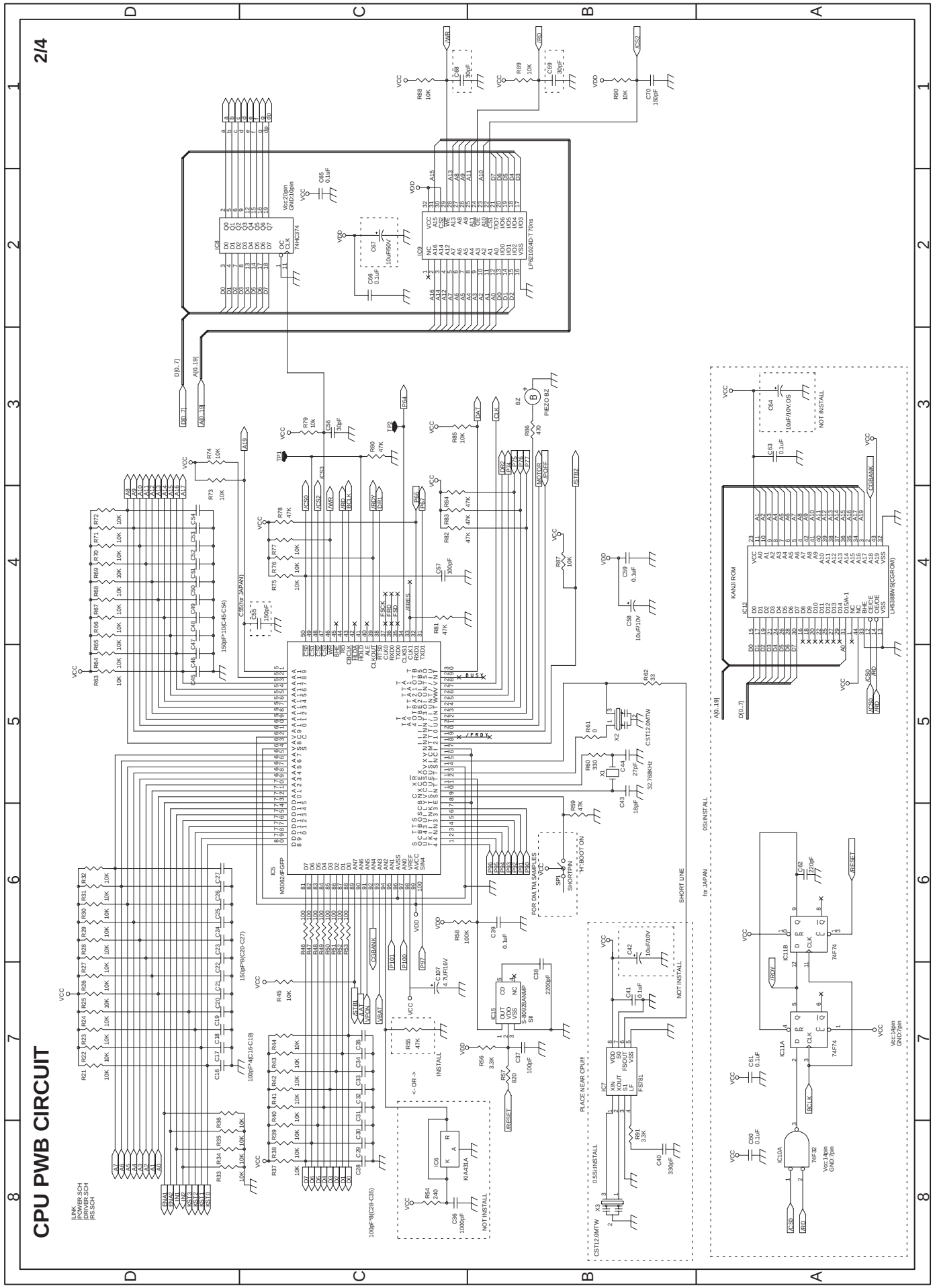
# CHAPTER 7. CIRCUIT DIAGRAM AND PWB LAYOUT

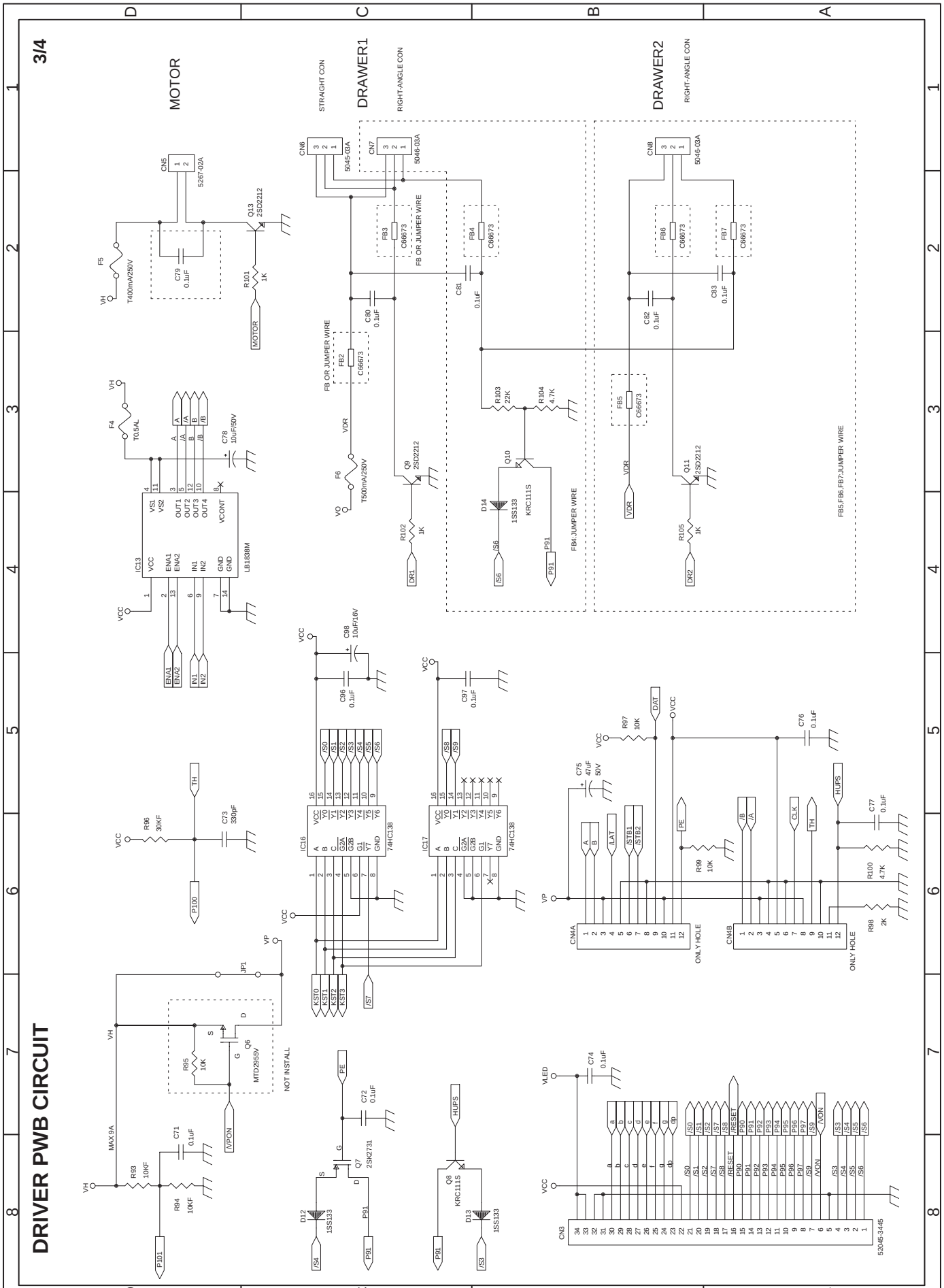
## POWER SUPPLY PWB CIRCUIT

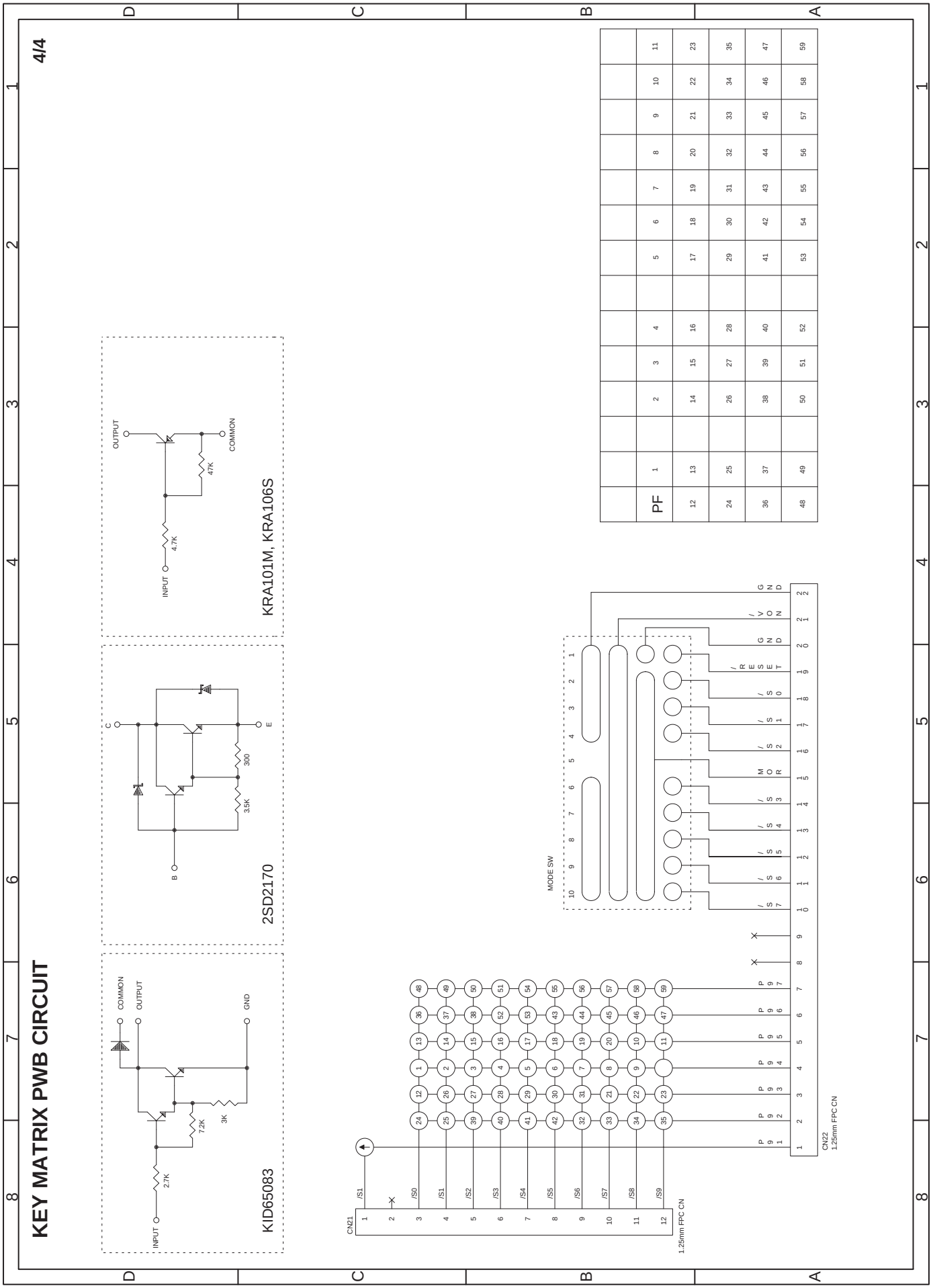
## 1. MAIN PWB CIRCUIT

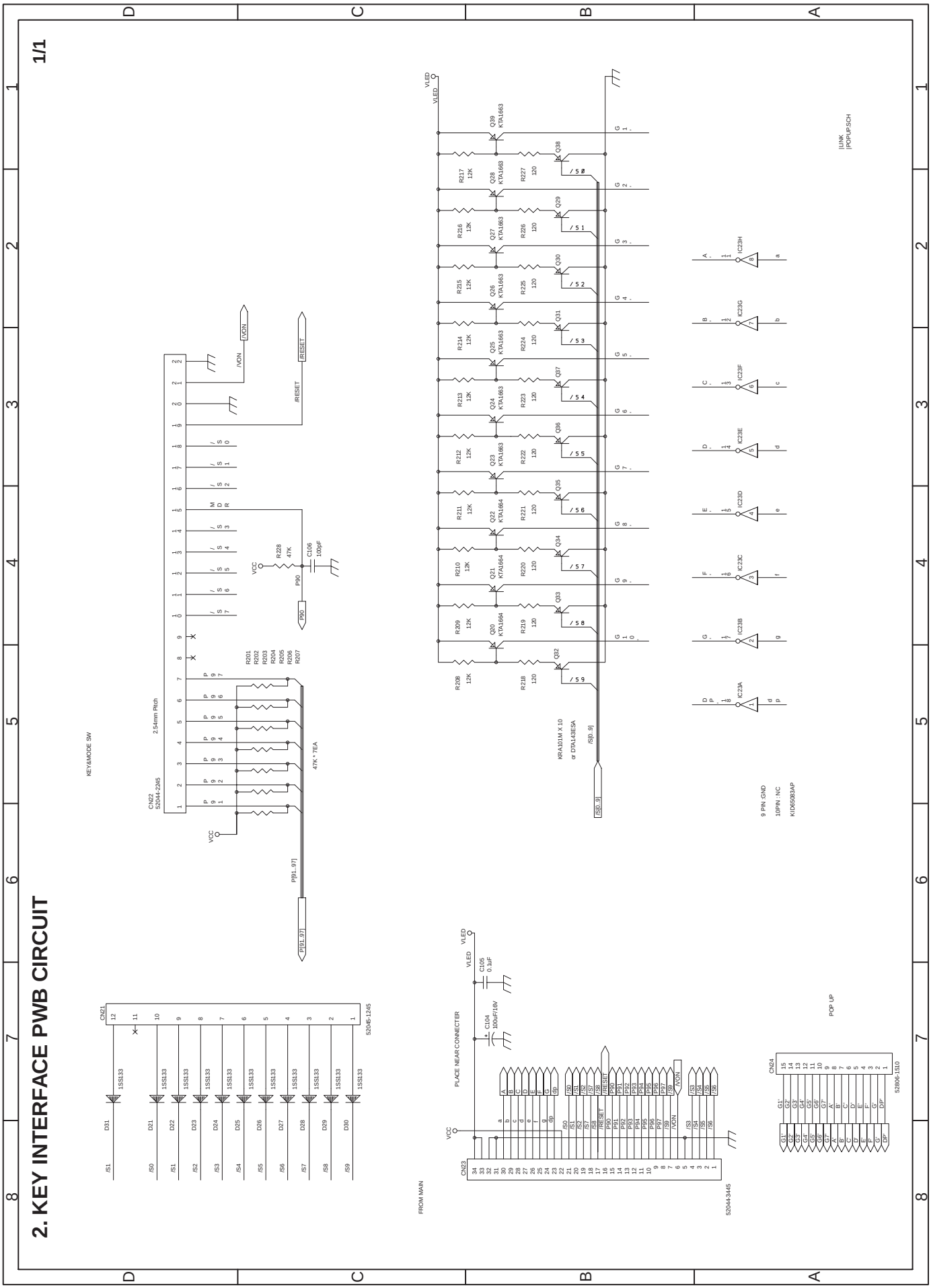
1/4

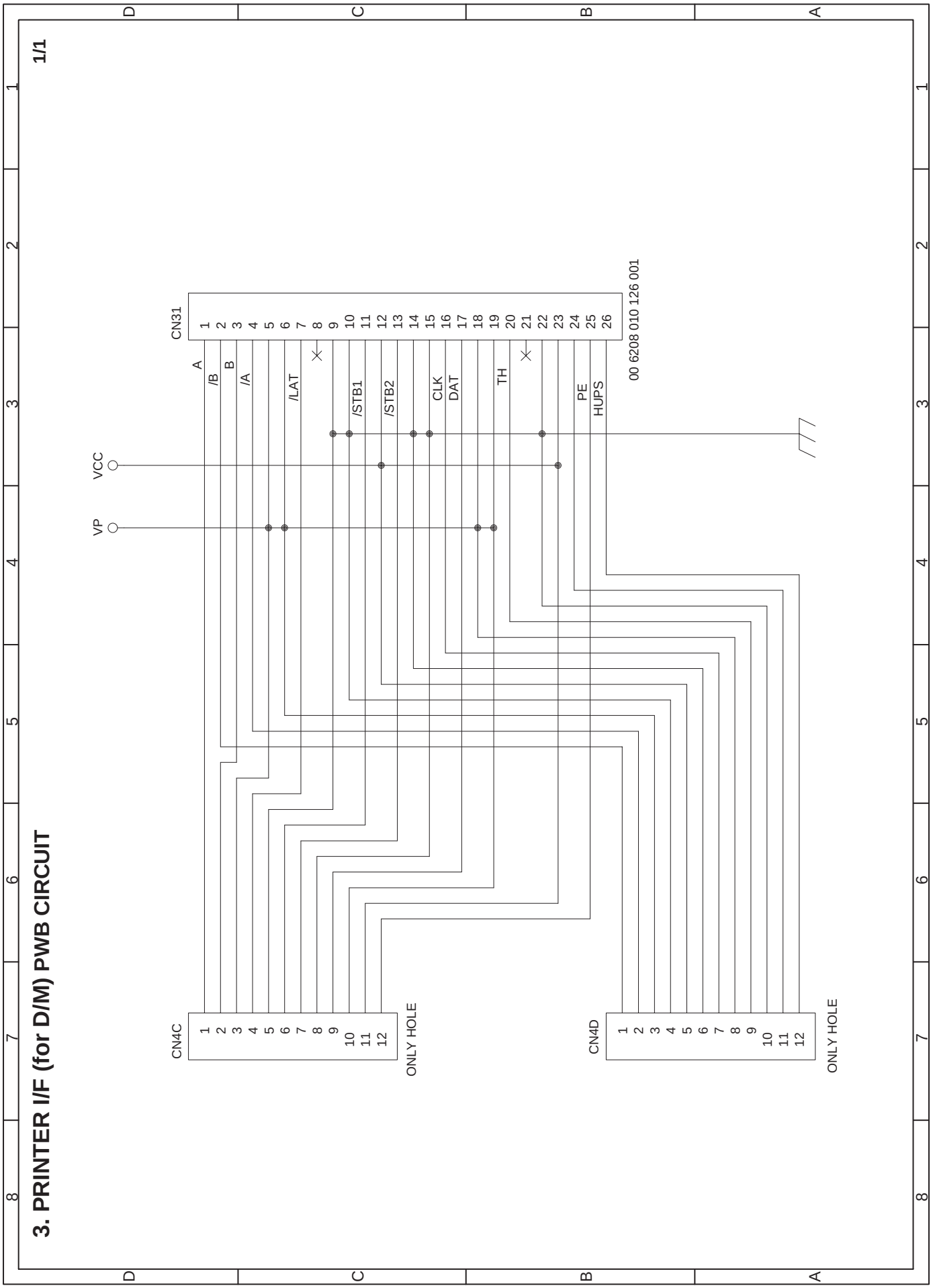


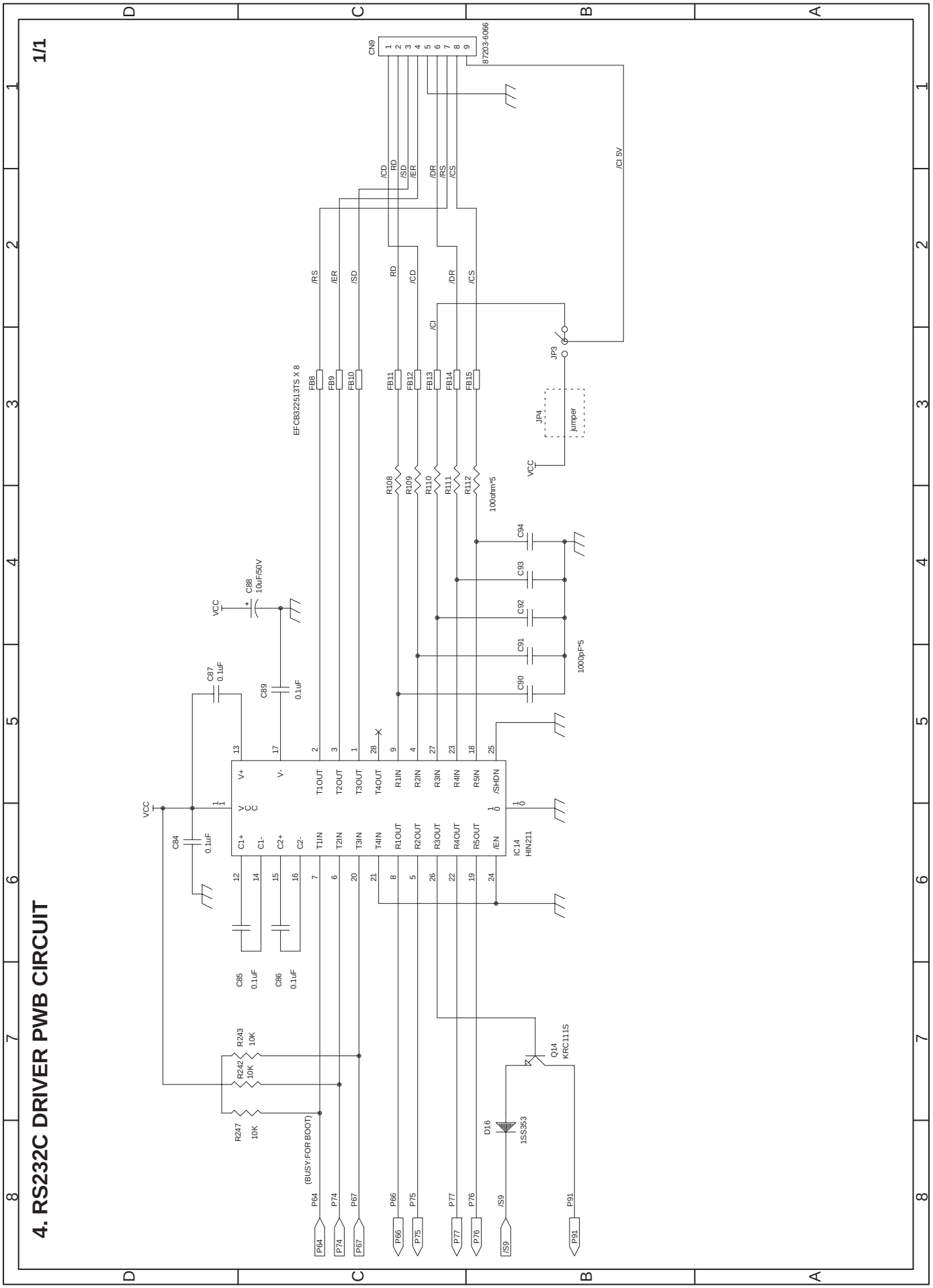

2/4
CPU PWB CIRCUIT
IC5
M38062MF-GPP
IC32
KANJI ROM
LH538BW(CGROM)
IC9
LP62S1024D-T 70ns
IC8
74HC374
IC6
KIA431A
IC7
FS781
IC15
S-80928ANMP
IC11A
IC11B
74F74
IC10A
74F32
X1
32.768KHz
X2
CST12.0MTW
X3
CST12.0MTW
PLACE NEAR CPU!!
SHORT LINE
NOT INSTALL
< OR >
INSTALL
FOR DM,TM,SAMPLES
"H" :BOOT ON
SHORTPIN
PIEZO BZ
MOTOR
RESET
CGBANK
JUNK
POWER.SCH
DRIVER.SCH
RS-232C
D[0..7]
A[0..19]
BUS
/FRDY
/RES
Vcc:20pin
GND:10pin
Vcc:14pin
GND:7pin
Vcc:14pin
GND:7pin
Vcc:14pin
GND:7pin
0.5SI:INSTALL
OSI:INSTALL
for JAPAN
NOT INSTALL


3/4
DRIVER PWB CIRCUIT
MOTOR
DRAWER1
DRAWER2
STRAIGHT CON
RIGHT-ANGLE CON
RIGHT-ANGLE CON
CN5
5267-02A
CN6
5045-03A
CN7
5046-03A
CN8
5046-03A
Q13
2SD2212
F5
T400mA/250V
C79
0.1uF
R101
1K
MOTOR
FB3
C66673
FB4
C66673
FB6
C66673
FB7
C66673
FB OR JUMPER WIRE
FB OR JUMPER WIRE
C80
0.1uF
C81
0.1uF
C82
0.1uF
C83
0.1uF
FB2
C66673
FB5
C66673
F6
T500mA/250V
Q9
2SD2212
Q10
Q11
2SD2212
R102
1K
R103
22K
R104
4.7K
R105
1K
D14
1SS133
KRC111S
FB4:JUMPER WIRE
FB5,FB6,FB7:JUMPER WIRE
DR1
DR2
VDR
F4
T0.5AL
C78
10uF/50V
IC13
LB1838M
VS1
VS2
OUT1
OUT2
OUT3
OUT4
VCONT
VCC
ENA1
ENA2
IN1
IN2
GND
GND
ENA1
ENA2
IN1
IN2
R96
30KF
C73
330pF
TH
P100
C98
10uF/16V
C96
0.1uF
C97
0.1uF
IC16
IC17
74HC138
/S0
/S1
/S2
/S3
/S4
/S5
/S6
/S7
/S8
/S9
KST0
KST1
KST2
KST3
JP1
NOT INSTALL
VP
VH
MAX 9A
R95
10K
Q6
MTD2955V
R93
10KF
R94
10KF
C71
0.1uF
/VPON
P101
PE
C72
0.1uF
Q7
2SK2731
D12
1SS133
P91
/S4
HUPS
Q8
KRC111S
D13
1SS133
P91
/S3
VLED
C74
0.1uF
CN3
52045-3445
a
b
c
d
e
f
g
dp
/S0
/S1
/S2
/S7
/S8
/RESET
P90
P91
P92
P93
P94
P95
P96
P97
/S9
/VON
/S3
/S4
/S5
/S6
R97
10K
DAT
C75
47uF
50V
A
B
/LAT
/STB1
/STB2
PE
R99
10K
/B
/A
CLK
TH
HUPS
C76
0.1uF
C77
0.1uF
R100
4.7K
R98
2K
CN4A
CN4B
ONLY HOLE
ONLY HOLE


4/4
KEY MATRIX PWB CIRCUIT
KID65083
INPUT
2.7K
7.2K
3K
COMMON
OUTPUT
GND
2SD2170
B
C
E
300
3.5K
KRA101M, KRA106S
INPUT
4.7K
47K
OUTPUT
COMMON
CN21
1.25mm FPC CN
CN22
1.25mm FPC CN
MODE SW
PF

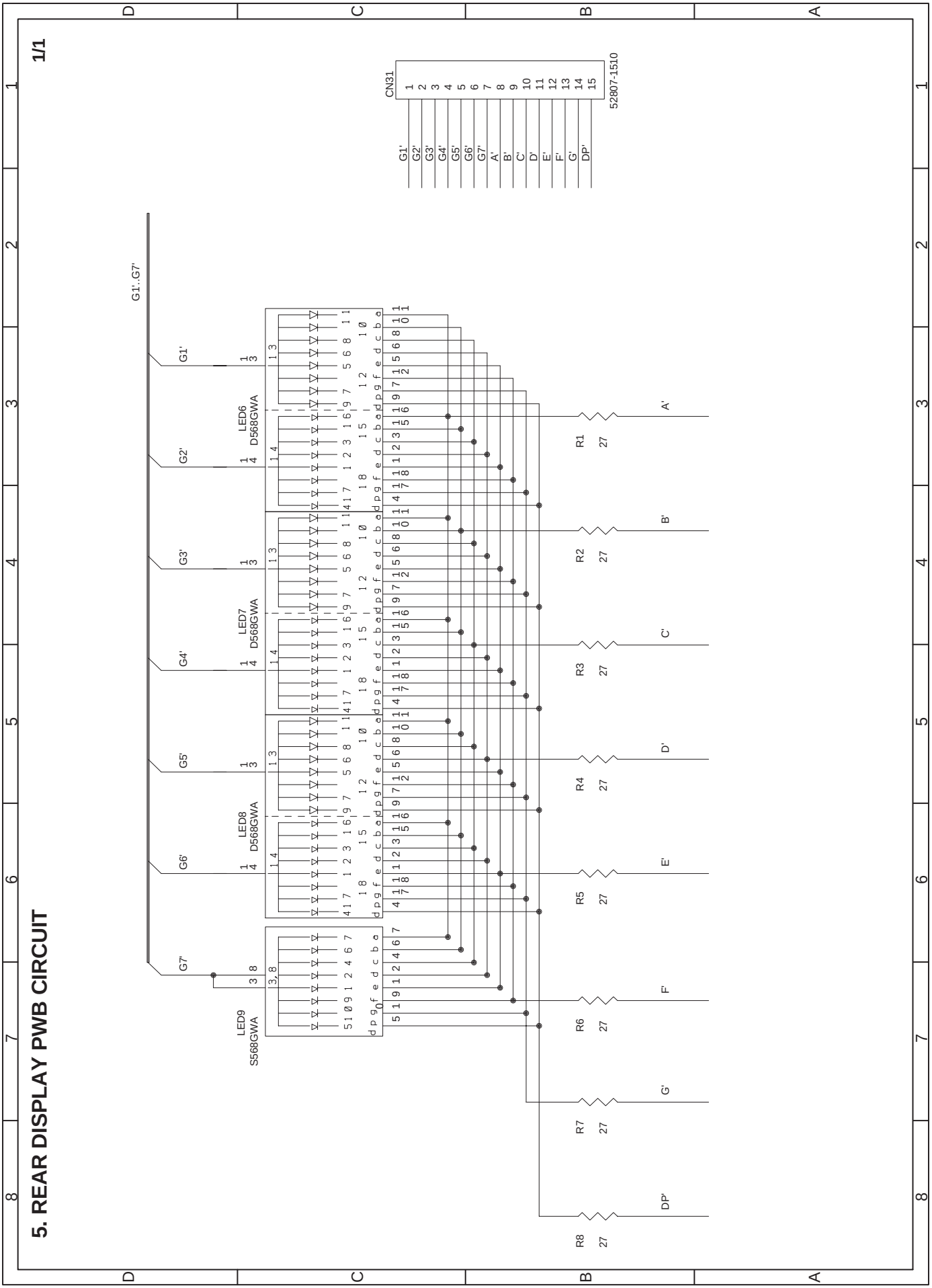

2. KEY INTERFACE PWB CIRCUIT
1/1
KEY&MODE SW
2.54mm Pitch
CN22
52044-2245
47K * 7EA
R201
R202
R203
R204
R205
R206
R207
R228
47K
C106
100pF
VCC
P90
P[91..97]
/RESET
/VKON
RESET
VKON
CN21
52046-1245
1SS133
D31
D21
D22
D23
D24
D25
D26
D27
D28
D29
D30
/S1
/S0
/S2
/S3
/S4
/S5
/S6
/S7
/S8
/S9
PLACE NEAR CONNECTER
C105
0.1uF
C104
100uF/16V
VLED
CN23
52044-3445
FROM MAIN
KRA101M X 10
or DTA143ESA
/S[0..9]
Q20
Q21
Q22
Q23
Q24
Q25
Q26
Q27
Q28
Q29
Q30
Q31
Q32
Q33
Q34
Q35
Q36
Q37
Q38
Q39
KRA1664
KRA1663
R209
R210
R211
R212
R213
R214
R215
R216
R217
R208
12K
R219
R220
R221
R222
R223
R224
R225
R226
R227
R218
120
9 PIN :GND
10PIN : NC
KID65083AP
IC23A
IC23B
IC23C
IC23D
IC23E
IC23F
IC23G
IC23H
CN24
52806-1510
POP UP
|UNK
|POP-UP.SCH


3. PRINTER I/F (for D/M) PWB CIRCUIT
1/1
CN31
A
/B
B
/A
/LAT
/STB1
/STB2
CLK
DAT
TH
PE
HUPS
00 6208 010 126 001
VCC
VP
CN4C
ONLY HOLE
CN4D
ONLY HOLE


4. RS232C DRIVER PWB CIRCUIT
1/1
CN9
87203-6066
/CD
RD
/SD
/ER
/DR
/RS
/CS
/CI 5V
JP3
JP4
jumper
VCC
EFCB322513TS X 8
FB8
FB9
FB10
FB11
FB12
FB13
FB14
FB15
R108
R109
R110
R111
R112
100ohm*5
C94
C93
C92
C91
C90
1000pF*5
C88
10uF/50V
C87
0.1uF
C89
0.1uF
C84
0.1uF
C85
0.1uF
C86
0.1uF
IC14
HIN211
V+
V-
T1OUT
T2OUT
T3OUT
T4OUT
R1IN
R2IN
R3IN
R4IN
R5IN
/SHDN
C1+
C1-
C2+
C2-
T1IN
T2IN
T3IN
T4IN
R1OUT
R2OUT
R3OUT
R4OUT
R5OUT
/EN
R243
10K
R242
10K
R247
10K
(BUSY-FOR BOOT)
Q14
KRC111S
D16
1SS353
P64
P74
P67
P66
P75
P77
P76
/S9
P91

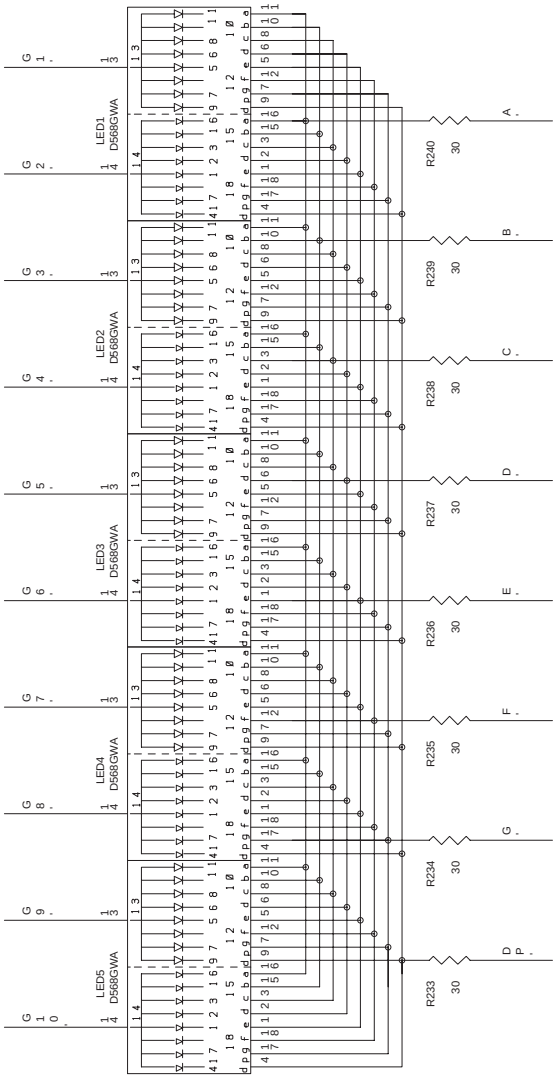
## 5. REAR DISPLAY PWB CIRCUIT

1/1



# 6. DISPLAY PWB CIRCUIT

1/1

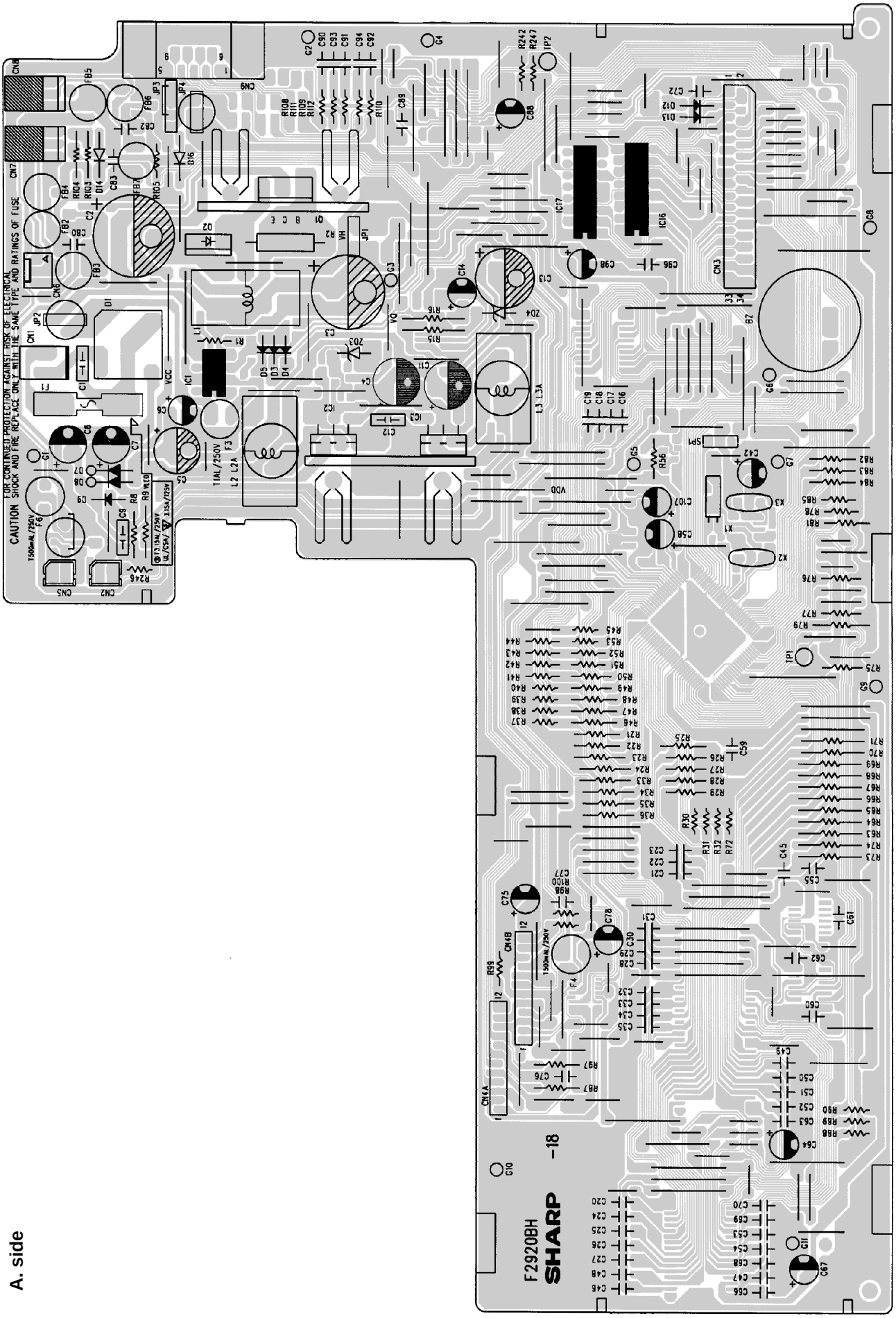



|LINK |POPUP.SCH

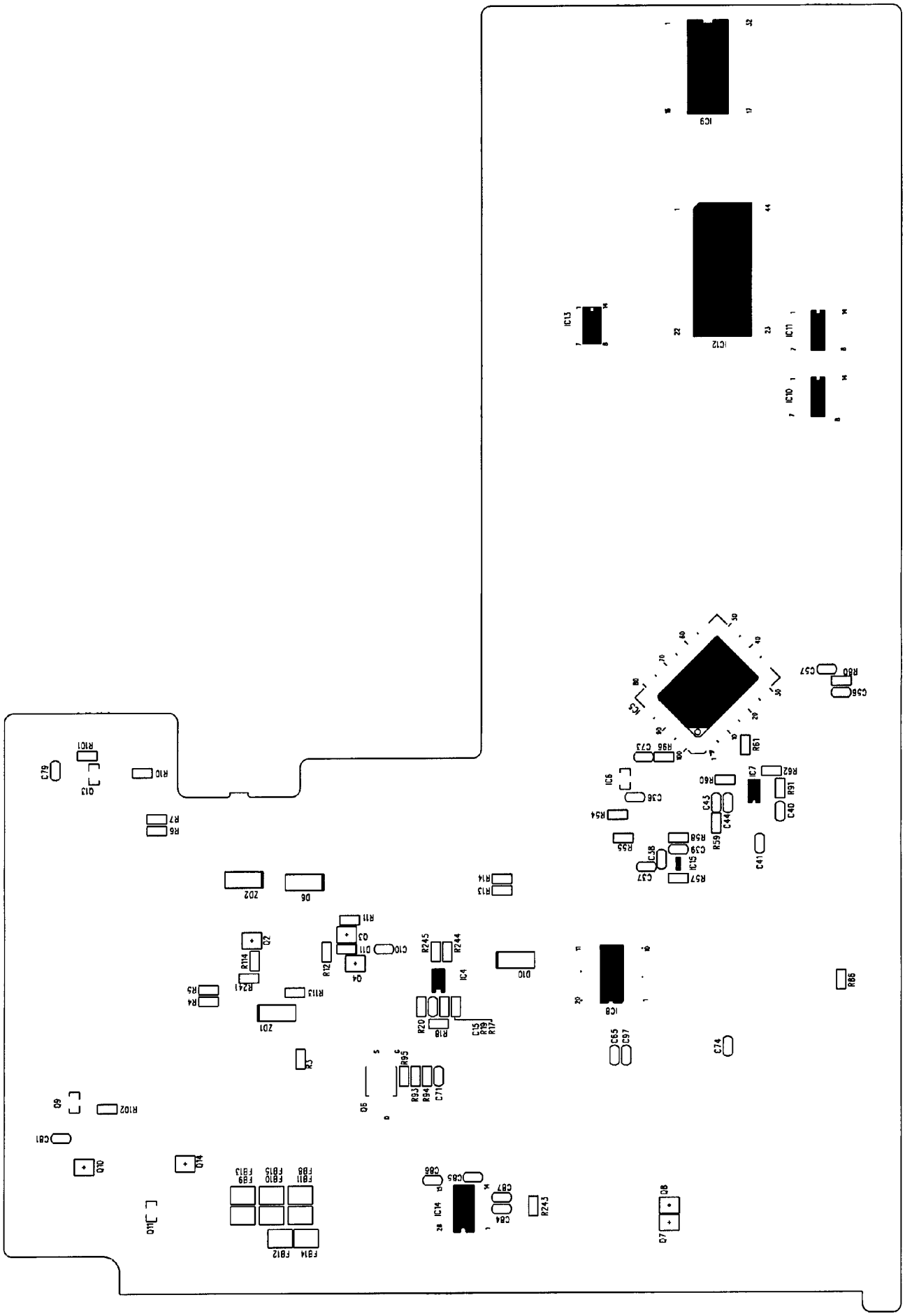
# PWB LAYOUT

## 1. MAIN PWB LAYOUT

### A. side

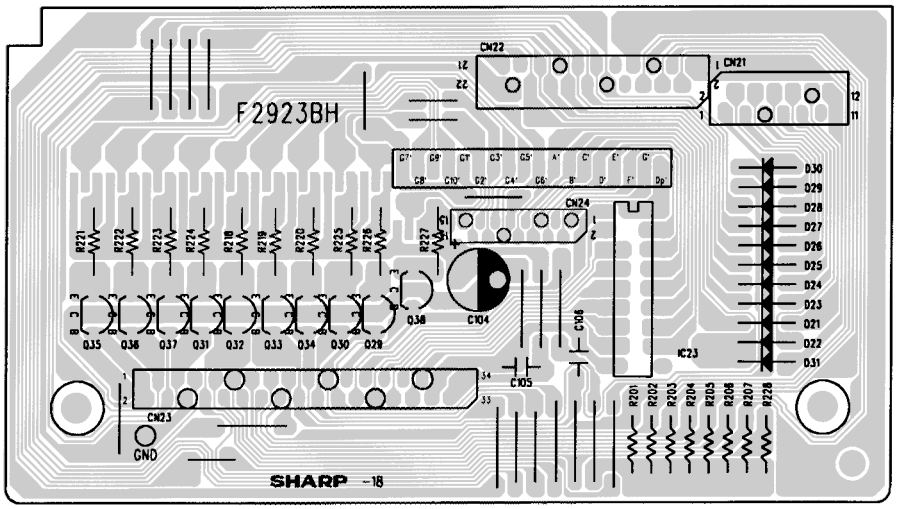


B. side

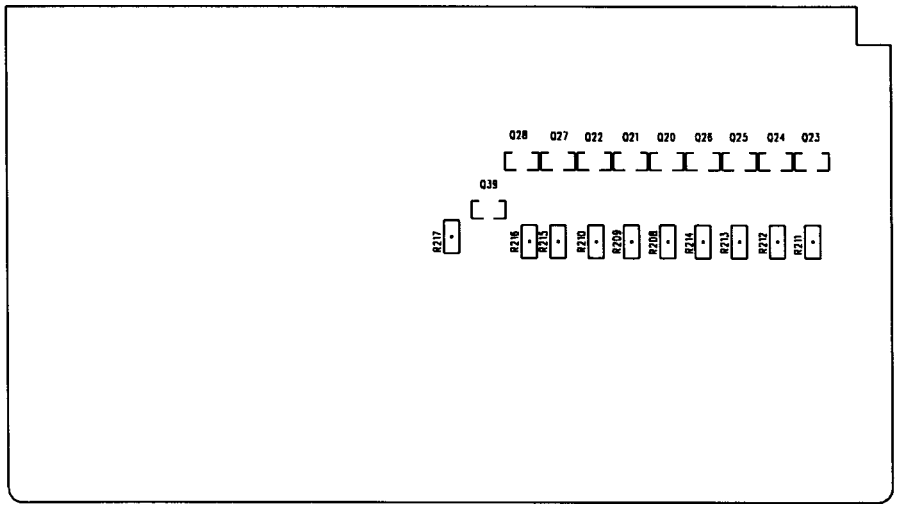


## 2. KEY INTERFACE PWB LAYOUT

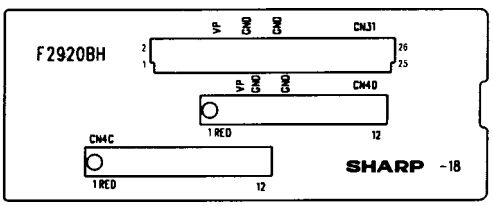
**A. side**



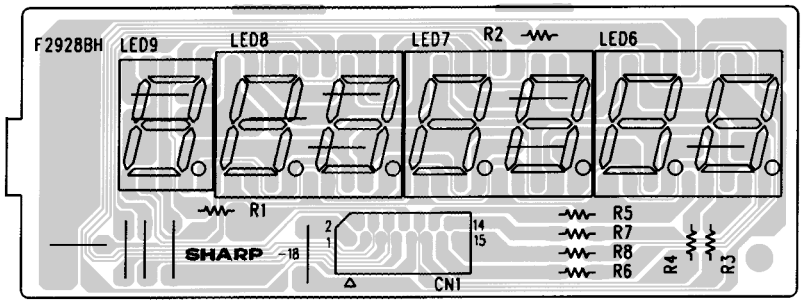

**B. side**



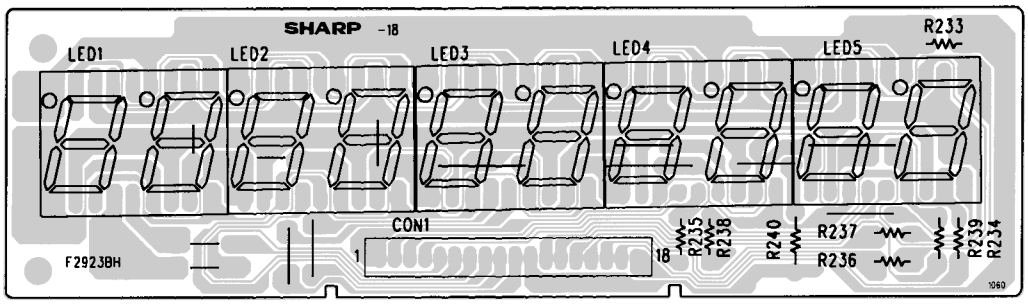

## 3. PRINTER I/F (for D/M) PWB LAYOUT



## 4. REAR DISPLAY PWB LAYOUT




## 5. DISPLAY PWB LAYOUT



SHARP

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